

Attachment 1 – Flow Frequency Memo

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY
Piedmont Regional Office
4949-A Cox Road Glen Allen, Virginia 23060

SUBJECT: Flow Frequency Determination / 303(d) Status
Omega Proteins, Inc. – VA0003867

TO: Jaime Bauer

FROM: Jennifer Palmore, P.G.

DATE: January 28, 2011

COPIES: File

The Omega Proteins, Inc. facility is located near Reedville in Northumberland County, VA. Omega discharges via outfall 995 to Cockrell Creek and via outfall 002 to an unnamed tributary of Cockrell Creek. Outfall 002 is located at rivermile 7-XAN000.14 and outfall 995 is located at rivermile 7-COC001.00. Flow frequencies have been requested at this site for use by the permit writer in developing effluent limitations for the VPDES permit.

Cockrell Creek and its tributary are tidally influenced at the discharge points. Flow frequencies cannot be determined for tidal waters, therefore the previously-determined dilution ratios (002: van Soestbergen, 9/17/1998; 995: default ratios) should be used to evaluate the effluent's impact on the waterbody. The Virginia Water Quality Standards classify Cockrell Creek as an estuarine waterbody; therefore the aquatic life saltwater criteria should be applied.

During the 2008 305(b)/303(d) Water Quality Assessment, Cockrell Creek at the discharge points was considered a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") The applicable fact sheets are attached. The Aquatic Life Use was impaired due to violation of the Chesapeake Bay Water Quality Standards for the Chesapeake Bay 5 Mesohaline (CB5MH) estuary; the estuary violated the submerged aquatic vegetation (SAV) acreage criteria. In addition, estuarine bioassessments is considered a non-impairing observed effect due to an impacted benthic population at a probabilistic monitoring station. The Fish Consumption Use was impaired due to a VDH Fish Consumption Advisory for PCBs in anadromous striped bass; in addition, arsenic is an observed effect due to a screening value exceedance. The Shellfishing Use was impaired due to VDH shellfish condemnation. The Recreation Use was impaired due to enterococci exceedances. The Wildlife Use was not assessed.

In the draft 2010 Assessment, the Cockrell Creek assessment unit was split and outfalls 002 and 995 are now assessed slightly differently. Both segments are considered Category 5D waters ("The Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring additional TMDL development.") The fact sheets are attached. The Aquatic Life Use remains impaired due to inadequate SAV in the CB5MH estuary; estuarine bioassessments is an observed effect. The Fish Consumption Use is impaired due to the VDH Fish Consumption Advisory for PCBs and arsenic is an observed effect due to a screening value exceedance. The Recreation Use is impaired due to enterococci; the bacterial TMDL was approved by the EPA on 12/8/2008. The Wildlife Use is fully supporting. The difference between the segments is that lower Cockrell Creek remains impaired for the Shellfishing Use; the bacterial TMDL was approved on 12/8/2008. However, the Shellfish Use was removed for the segment of Cockrell Creek to which outfall 995 discharges because VDH considers the area to be administratively condemned.

Flow Frequency Determination
Omega Proteins, Inc. – VA0003867
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As mentioned above, the bacterial impairments on Cockrell Creek were addressed in a TMDL which was approved by the EPA on 12/8/2008 and by the SWCB on 4/28/2009. The TMDL states that “DEQ conducted a special study around the Omega Protein, Inc. facility from August 2006 to February 2007. Data collected from this study shows high bacteria counts in the waters surrounding the facility and from the industrial discharge. This data indicates the facility is a significant contributor to the bacterial impairments in Cockrell Creek.” Outfall 002 was assigned a fecal coliform wasteload allocation of 2.55E+08 MPN/day and outfall 995 received a wasteload allocation of 7.52E+09 MPN/day to address the Shellfish Use impairment. The TMDL states that “effluents from the Omega facility must meet the shellfish water quality standard at the end of pipe.” In addition, the outfalls received enterococci wasteload allocations of 6.37E+08 MPN/day and 1.88E+10 MPN/day, respectively, in order to address the Recreation Use impairment.

The Omega Protein facility was also included in the Chesapeake Bay TMDL which was approved by the EPA on 12/29/2010. The TMDL addressed all dissolved oxygen and SAV impairments in the Chesapeake Bay and its tidal tributaries. The facility received the following annual wasteload allocations:

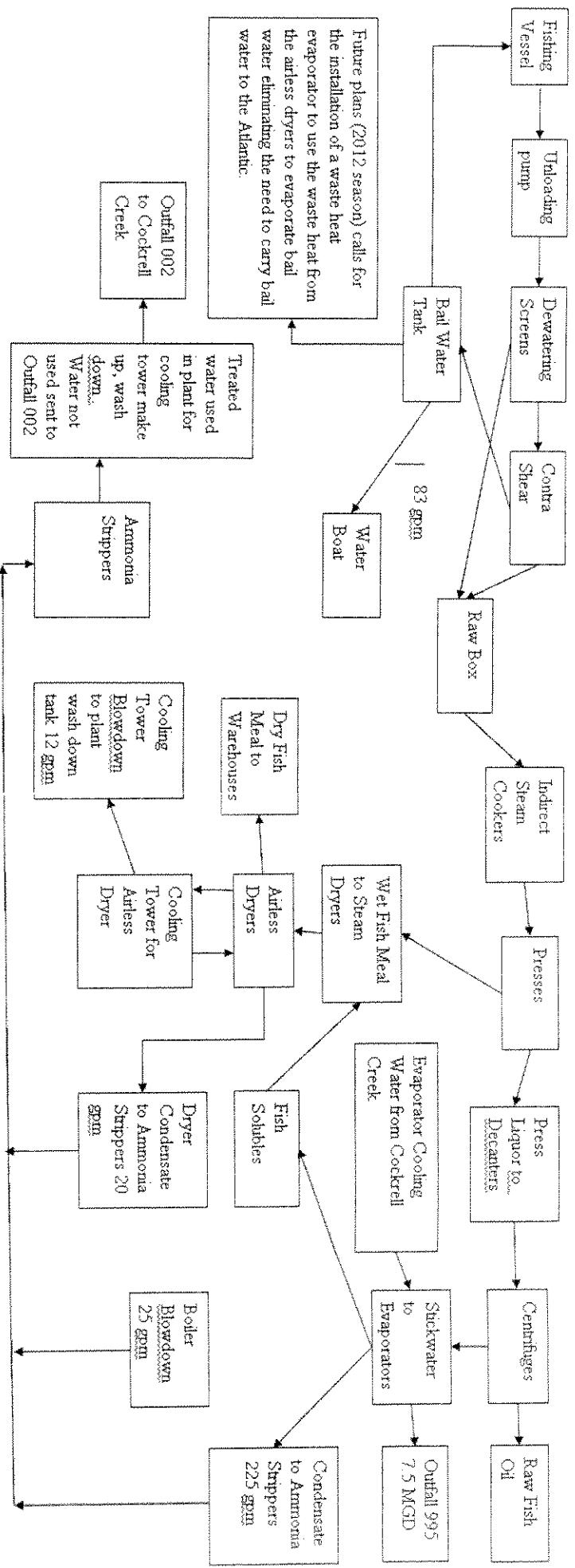
- 21,213 lbs of total nitrogen
- 1,591 lbs of total phosphorus
- 352,836 lbs of total suspended solids

Water quality data from monitoring station 7-COC001.61 is attached. The station is located on Cockrell Creek approximately 0.6 mile upstream of the facility at the end of Main Street in Reedville.

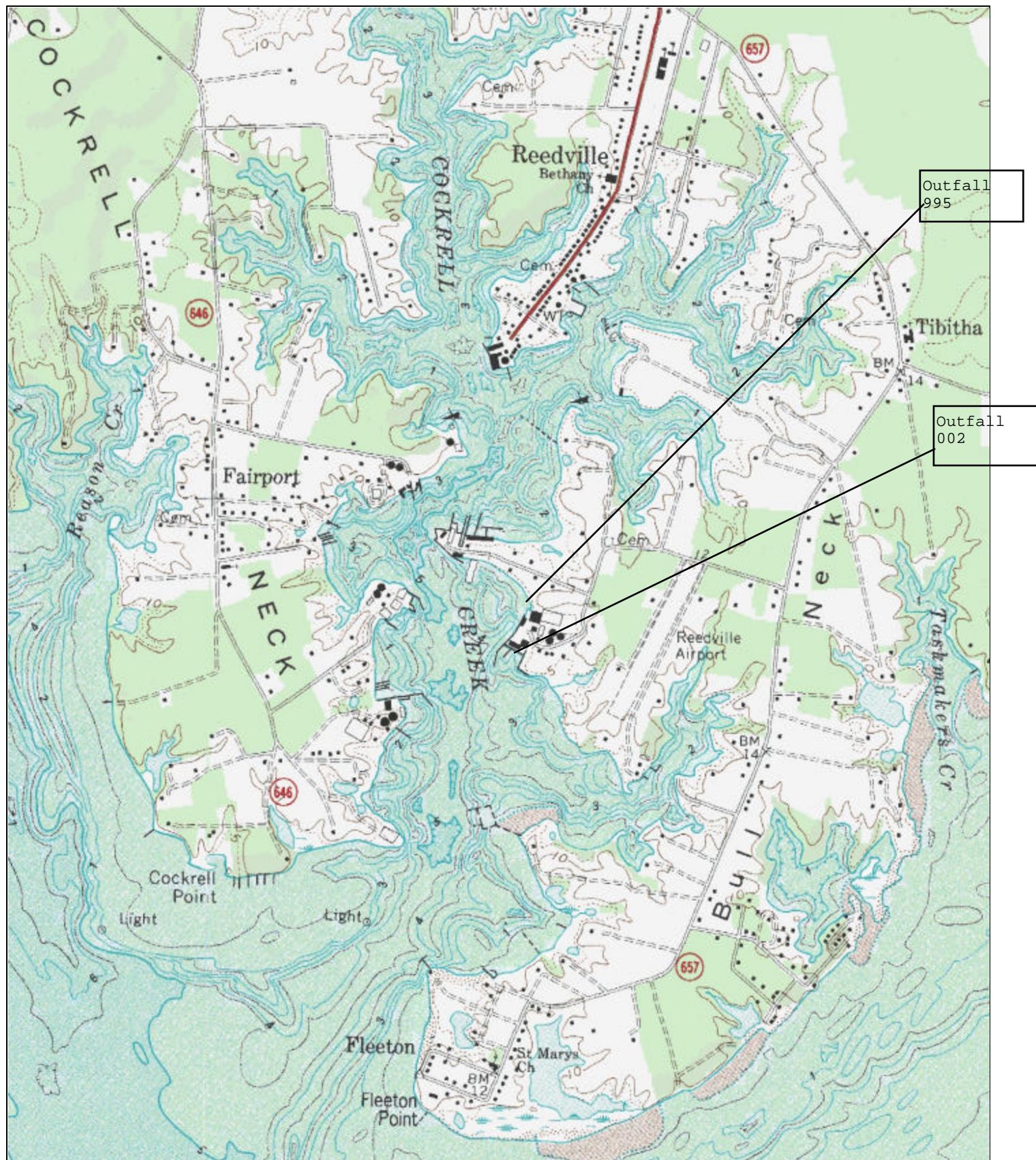
During the 1979 modeling by VIMS, dischargers on Cockrell Creek were allocated 5,000 lbs/day of cBOD₅ “in order that 5.0 mg/L of DO will be maintained in the upper layer of that receiving stream”. As 5.0 mg/L was the minimum dissolved oxygen standard at the time, and remains the 30-day mean standard, Cockrell Creek was considered to be fully allocated and therefore is considered a Tier 1 water.

If you have any questions concerning this analysis, please let me know.

Attachment 2 – Facility Operations Diagram



Attachment 3 – Topographic Map



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0.5 Mi

0

2000 Ft

Map provided by MyTopo.com

Attachment 4 – Ambient Monitoring Data for 7-COC001.61

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Salinity	Secchi Depth
7-COC001.61	10/21/1993	S	0.3	19.1	7.87	8		18	
7-COC001.61	12/13/1993	S	0.3	6.02	7.8		0.57		
7-COC001.61	2/16/1994	S	0.3	2.7	8.19	14.4		13	
7-COC001.61	4/6/1994	S	0.3	12.4	8.48	11.3		10	
7-COC001.61	6/7/1994	S	0.3	23.1	8.08	7.2		10	
7-COC001.61	8/9/1994	S	0.3	24.6	8.1	8.2		13.5	
7-COC001.61	12/15/1994	S	0.3	7.7	8.08	9.5		16.5	
7-COC001.61	2/9/1995	S	0.3	0.8	8.85	12.8		16	
7-COC001.61	6/12/1995	S	0.3	26.7	7.83	7.15		17.2	
7-COC001.61	8/11/1995	S	0.3	28.45	8.24	7.07		19.1	1.1
7-COC001.61	8/11/1995	M	1	28	8.2	6.44		19.3	
7-COC001.61	8/11/1995	M	3	27	7.96	3.85		19.3	
7-COC001.61	8/11/1995	B	4	26.85	7.88	3.3		19.3	
7-COC001.61	9/13/1995	S	0.3	24.98	8.05	6.36		22	
7-COC001.61	12/11/1995	S	0.3	4.09	7.8	11.06		21.2	
7-COC001.61	3/18/1996	S	0.3	7.73	7.57	11.09		14.3	
7-COC001.61	6/20/1996	S	0.3	29.5	8.65	10.31		11.8	
7-COC001.61	9/19/1996	S	0.3	22.97	7.63	6.4		13.2	
7-COC001.61	12/12/1996	S	0.3	6.61	7.75	11.73		12.2	
7-COC001.61	3/10/1997	S	0.3	9.74	8.29	12.37		9.9	
7-COC001.61	6/5/1997	S	0.3	20.56	7.66	8.32		12.9	
7-COC001.61	7/28/1997	S	0.3	28.53	7.72	6.62		15.2	
7-COC001.61	9/16/1997	S	0.3	26.33	7.82	7.42		17	
7-COC001.61	11/17/1997	S	0.3	10.03	8.05	8.16		19.1	
7-COC001.61	1/13/1998	S	0.3	7.83	8	8.52		20	
7-COC001.61	3/11/1998	S	0.3	8.29	8.38	11.69		13.2	
7-COC001.61	5/14/1998	S	0.3	15.98	7.57	6.85		10.4	
7-COC001.61	7/13/1998	S	0.3	27.2	8.26	6.83		12.2	
7-COC001.61	8/24/1998	S	1	28.4	8.07	8.28		16.3	0.5
7-COC001.61	9/8/1998	S	0.3	27.01	7.93	7.23		18.8	
7-COC001.61	9/8/1998	M	1	27.02	7.9	7.28		18.8	0.8
7-COC001.61	9/8/1998	B	2	27.02	7.86	7.35		18.8	
7-COC001.61	9/15/1998	S	0.3	26.08	8.15	8.33		15.6	
7-COC001.61	9/21/1998	S	0.3	26.61	8.17	7.53		16.4	
7-COC001.61	9/21/1998	M	1	26.06	8.09	6.2		16.6	0.7
7-COC001.61	9/21/1998	M	2	25.87	7.79	4.12		16.6	
7-COC001.61	9/21/1998	B	2.7	25.85	7.62	3.11		16.7	
7-COC001.61	10/8/1998	S	2.9	20.94	7.87	6.17		17.3	
7-COC001.61	10/8/1998	S	0.3	21.12	8.09	7.47		17.9	
7-COC001.61	10/8/1998	M	1	21.12	8.09	7.47		17.9	0.5
7-COC001.61	10/8/1998	B	2	21.03	8.06	7.37		17.8	
7-COC001.61	10/22/1998	S	0.3	17.74	7.71	6.65		20.5	
7-COC001.61	10/22/1998	M	1	17.76	7.7	6.61		20.5	0.7
7-COC001.61	10/22/1998	B	1.7	17.73	7.64	6.77		20.5	
7-COC001.61	11/5/1998	S	0.3	13.41	7.7	7.22		21.8	
7-COC001.61	11/5/1998	M	1	13.41	7.7	7.25		21.8	0.8
7-COC001.61	11/5/1998	B	2.1	13.41	7.68	7.25		21.8	
7-COC001.61	11/16/1998	S	0.3	12.2	8.02	10.34		19	
7-COC001.61	11/19/1998	S	0.3	12.54	8.28	12		17.5	
7-COC001.61	11/19/1998	M	1	12.34	8.27	11.74		17.5	0.7
7-COC001.61	11/19/1998	M	2	12.43	8.2	11.37		17.5	
7-COC001.61	11/19/1998	B	2.7	12.44	8.05	11.55		17.6	
7-COC001.61	1/13/1999	S	0.3	3.96	7.58	14.01		21.5	
7-COC001.61	3/15/1999	S	0.3	5.22	7.7	10.4		22.1	
7-COC001.61	5/10/1999	S	0.3	22.35	8.02	9.4		16	
7-COC001.61	5/10/1999	S	1	22.2	8.02	8.9		16	0.8
7-COC001.61	5/10/1999	B	1.4	22	8.02	9.34		16	
7-COC001.61	5/12/1999	S	0.3	22.41	8.42	9.7		16.8	
7-COC001.61	5/24/1999	S	0.3	22.98	7.92	6.75		18	
7-COC001.61	5/24/1999	S	1	22.98	7.92	6.78		18	0.9
7-COC001.61	5/24/1999	B	1.4	22.96	7.81	6.63		18	
7-COC001.61	6/7/1999	S	0.3	26.82	8.54	8.69		16.5	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Salinity	Secchi Depth
7-COC001.61	6/7/1999	S	1	25.73	8.55	8.09		16.7	0.5
7-COC001.61	6/21/1999	S	0.3	22.03	8.39	8.57		17.1	
7-COC001.61	6/21/1999	S	1	22.03	8.37	8.51		17.1	0.4
7-COC001.61	6/21/1999	B	1.5	22.01	8.36	8.61		17.1	
7-COC001.61	7/1/1999	S	0.3	27.6	8.25	7.5		19.6	
7-COC001.61	7/1/1999	S	1	27.2	8.2	6.7		20	0.6
7-COC001.61	7/13/1999	S	0.3	25.41	8.13	5.34		17.3	
7-COC001.61	7/22/1999	S	0.3	28.22	8.54	8.27		17.3	
7-COC001.61	7/22/1999	S	1	28.07	8.35	6.01		17.5	0.5
7-COC001.61	7/22/1999	B	1.4	27.95	8.19	4.36		17.7	
7-COC001.61	8/4/1999	S	0.3	29.96	8.51	9.31		17.8	
7-COC001.61	8/4/1999	S	1	29.94	8.49	9.22		17.9	0.4
7-COC001.61	8/19/1999	S	0.3	28.98	8.39	7.53		24	
7-COC001.61	8/19/1999	S	1	28.95	8.37	7.5		24	0.5
7-COC001.61	9/2/1999	S	0.3	21.51	8.23	8.37		21.4	
7-COC001.61	9/2/1999	S	1	21.5	8.22	8.35		21.4	0.7
7-COC001.61	9/14/1999	S	0.3	25.52	7.99	8.04		17.7	
7-COC001.61	9/29/1999	S	0.3	23.43	7.98	7.49		22.8	
7-COC001.61	9/29/1999	S	1	23.01	7.92	7.12		23.1	1.1
7-COC001.61	9/29/1999	B	1.7	22.83	7.85	6.74		23.4	
7-COC001.61	10/6/1999	S	0.3	20.43	8.06	7.96		20	
7-COC001.61	10/6/1999	S	1	20.17	8.06	7.89		20.7	0.9
7-COC001.61	10/21/1999	S	0.3	17.04	7.7	8.17		17.5	1.1
7-COC001.61	10/21/1999	B	1.1	17.11	7.69	7.93		17.5	
7-COC001.61	11/8/1999	S	0.3	13.66	7.95	7.06		19.5	
7-COC001.61	1/24/2000	S	0.3	1.28	7.87	11.74		19.8	
7-COC001.61	3/16/2000	S	0.3	12.61	8.16	10.28		17.1	
7-COC001.61	5/18/2000	S	0.3	25.06	8.21	8.25	8.2	13.2	
7-COC001.61	5/23/2000	S	0.3	21.55	8.16	8.28		14.01	
7-COC001.61	5/23/2000	S	1	21.54	8.15	8.24		14.01	0.6
7-COC001.61	6/14/2000	S	0.3	25.75	8.01	6.07		14	
7-COC001.61	6/14/2000	S	1	25.69	7.98	4.46		14	0.6
7-COC001.61	6/14/2000	M	2	25.52	7.86	4.78		14.1	
7-COC001.61	6/14/2000	M	2.5	25.34	7.83	3.66		14.1	
7-COC001.61	7/6/2000	S	0.3	29.91	8.29	7.44		13.8	
7-COC001.61	7/6/2000	B	1	28.89	8.22	6.16		14	0.2
7-COC001.61	7/12/2000	S	0.3	27.9	8.45	7.65	8.2	14.51	
7-COC001.61	8/1/2000	S	0.3	28.8	8.57	10.15		13	
7-COC001.61	8/1/2000	B	1	28.58	8.54	9.62		13	0.6
7-COC001.61	9/5/2000	S	0.3	25.56	7.51	3.83		14.3	
7-COC001.61	9/5/2000	B	1	25.6	7.5	3.83		14.2	1.1
7-COC001.61	9/7/2000	S	0.3	23.47	7.57	7.14		14.4	
7-COC001.61	10/26/2000	S	0.3	18.76	7.99	8.15		16.2	
7-COC001.61	10/26/2000	B	1	18.36	7.99	8.15		16.2	0.8
7-COC001.61	11/7/2000	S	0.3	13.61	8.14	9.77		16.42	
7-COC001.61	1/3/2001	S	0.3	1.05	7.9	12.21		20.5	
7-COC001.61	3/7/2001	S	0.3	5.22	7.95	10.81		17.02	
7-COC001.61	5/15/2001	S	0.3	21.5	7.77	6.6		15.6	
7-COC001.61	7/17/2001	S	0.3	28.42	8.14	8.19		15.86	
7-COC001.61	9/24/2001	S	0.3	24.98	7.79	8.51		17.74	
7-COC001.61	11/19/2001	S	0.3	13.57	7.88	9.15		19.6	
7-COC001.61	1/15/2002	S	0.3	5.55	7.51	11.81		20.8	
7-COC001.61	4/1/2002	S	0.3	13.8	8.06	8.58		19.61	
7-COC001.61	5/1/2002	S	0.3	20.31	8.1	9.79		18.52	
7-COC001.61	8/28/2002	S	0.3	26.41	7.37	4.5		19.23	
7-COC001.61	10/28/2002	S	0.3	15.96	7.49	7.86		21.68	
7-COC001.61	2/5/2003	S	0.3	3.64	7.89	13.79		15.93	
7-COC001.61	4/29/2003	S	0.3	19.64	7.96	9.79		10.9	
7-COC001.61	6/11/2003	S	0.3	25.29	8.29	9.16		11.97	
7-COC001.61	8/4/2003	S	0.3	28.55	8.11	7.52		12.55	
7-COC001.61	10/6/2003	S	0.3	19.7	7.85	7.54		12.65	
7-COC001.61	12/15/2003	S	0.3	6.3	8.44	12.7		11.8	

Station ID	Collection Date	Depth Desc	Depth	Temp Celcius	Field Ph	Do Probe	Do Winkler	Salinity	Secchi Depth
7-COC001.61	3/11/2004	S	0.3	7.99	8	11.51		12.22	
7-COC001.61	4/27/2004	S	0.3	19.55	8.58	10.26		11.3	
7-COC001.61	6/8/2004	S	0.3	27.75	8.02	8.1		11.95	
7-COC001.61	6/24/2004	S	0.3	26.54	8.42	7.15		12.58	
7-COC001.61	7/8/2004	S	0.3	28.81	8.14	5.83		13.08	
7-COC001.61	7/28/2004	S	0.3	27.63	7.98	7.66		12.14	
7-COC001.61	8/16/2004	S	0.3	24.93	7.77	5.2		13.08	
7-COC001.61	9/20/2004	S	0.3	21.63	7.96	8.18		13.83	
7-COC001.61	9/27/2004	S	0.3	23.93	8.45	8.56		13.2	
7-COC001.61	10/20/2004	S	0.3	16.97	8.07	8.24		11.39	
7-COC001.61	11/18/2004	S	0.3	10.74	8.32	12.82		11.71	
7-COC001.61	11/29/2004	S	0.3	11.14	8.61	11.6		12.6	
7-COC001.61	1/31/2005	S	0.3	0.49	8.24	13.41		10.87	
7-COC001.61	3/30/2005	S	0.3	13.56	8.27	12.69		11.14	
7-COC001.61	5/9/2005	S	0.3	16.88	8.31	10.8		9.83	
7-COC001.61	5/23/2005	S	0.3	21.25	8.46	6.5		10.77	
7-COC001.61	6/9/2005	S	0.3	27.02	7.69	6.38		10.58	
7-COC001.61	6/28/2005	S	0.3	29.51	8.31	7.13		11.9	
7-COC001.61	7/18/2005	S	0.3	30.83	8.16	6.7		12.79	
7-COC001.61	8/8/2005	S	0.3	31.16	8.54	9.36		13.96	
7-COC001.61	9/13/2005	S	0.3	27.44	8.04	6.37		16.74	
7-COC001.61	9/13/2005	S	0.3	27.44	8.04	6.37		16.74	
7-COC001.61	10/25/2005	S	0.3	16.26	7.74	7.75		17.57	
7-COC001.61	11/8/2005	S	0.3	16.22	8.05	8.75		16.23	
7-COC001.61	11/16/2005	S	0.3	15.65	8.23	9.78		17.55	
7-COC001.61	2/2/2006	S	0.3	6.84	8.31	12.13		13.72	
7-COC001.61	5/23/2006	S	0.3	21.2	8	7.7		14.9	
7-COC001.61	5/30/2006	S	0.3	26.3	8	7.6		15.3	
7-COC001.61	6/28/2006	S	0.3	27.7	8.1	6.4		15.2	
7-COC001.61	7/20/2006	S	0.3	31.3	8.3	7		15.4	
7-COC001.61	7/26/2006	S	0.3	28.7	8.2	7.6		15.3	
7-COC001.61	8/28/2006	S	0.3	29.7	8.2	7		16	
7-COC001.61	8/30/2006	S	0.3	29.1	8.2	6.9		18.6	
7-COC001.61	9/14/2006	S	0.3	23.2	7.3	4.2		17.6	
7-COC001.61	10/25/2006	S	0.3	13.8	7.7	8.9		16.9	
7-COC001.61	11/20/2006	S	0.3	12.5	7.9	10.3		16.6	
7-COC001.61	11/27/2006	S	0.3	10.4	8.1	11.8		11.2	
7-COC001.61	2/22/2007	S	0.3	5.4	7.6	14		13.1	
7-COC001.61	4/9/2007	S	0.3	12.4	8.4	10.8		12.6	
7-COC001.61	6/5/2007	S	0.3	25.3	8.1	8.7		13	
7-COC001.61	8/23/2007	S	0.3	26.7	7.9	7.2		16.6	
7-COC001.61	10/30/2007	S	0.3	17.1	7.5	7.8		19	
7-COC001.61	12/20/2007	S	0.3	6.7	8.2	11.1		20.1	
7-COC001.61	2/27/2008	S	0.3	7.1	8.2	5.3		16.8	
7-COC001.61	2/29/2008	S	0.3	6.3	7.3	11.7		16.1	
7-COC001.61	4/23/2008	S	0.3	17.7	8.3	8.6		12	
7-COC001.61	6/23/2008	S	0.3	26.6	8.1	6.9		11.8	
7-COC001.61	8/6/2008	S	0.3	29.3	8.2	5.1		14	
7-COC001.61	10/9/2008	S	0.3	20.7	8	7.1		17.4	
7-COC001.61	12/17/2008	S	0.3	7.3	8.1	11.4		18.8	
7-COC001.61	1/8/2009	S	0.3	5.8	7.9	10.7		18.2	
7-COC001.61	3/19/2009	S	0.3	9.1	8	11.1		16.5	
7-COC001.61	5/14/2009	S	0.3	20.5	8.4	8.7		12.7	
7-COC001.61	7/16/2009	S	0.3	27.7	8.5	8.5		14.9	
7-COC001.61	9/10/2009	S	0.3	23.4	7.4	5.1		15.5	
7-COC001.61	11/23/2009	S	0.3	13.2	7.7	9.1		15.3	
7-COC001.61	2/22/2010	S	0.3	6.2	7.5	12.5		11.6	
7-COC001.61	4/5/2010	S	0.3	17.1	8.2	11		10.6	
7-COC001.61	6/3/2010	S	0.3	28.3	8.1	11.2		11.9	
7-COC001.61	8/31/2010	S	0.3	29.2	7.9	6.8		15.8	
7-COC001.61	10/12/2010	S	0.3	20.7	7.7	8.3		18.1	
7-COC001.61	12/14/2010	S	0.3	3.3	7.5	11.9		18.7	

Attachment 5 – 1976 VIMS Model for Cockrell Creek

4010 WEST FIFTH ST.

State Water Control Board

P. O. Box 11143

Project Fact Sheet

RICHMOND, VA.

SUBJECT: Menhaden Industries Permit Reissuance - Cockrell Creek Wasteload Allocation - Northumberland County

TO: File - Kilmarnock Office

FROM: G. T. Yagel

DATE: August 15, 1979

COPIES: L. S. McBride, L. G. Lawson, A. J. Anthony, J. R. Bell, F. K. Cunningham
Dale F. Jones, Burton R. Tuxford

In anticipation of this division's responsibilities for the reissuance of permits for two menhaden industries in Northumberland County, the issue of wasteload allocation for CBOD₅ has been under consideration for more than a year. The deadline date for the reissuance is January 1980. No attempt will be made to include in this memorandum a summary of all of the items brought forth in many conferences with VIMS, the permittee consultants, and other staff members. That information can be found in our regional office file. The purpose of this memorandum is to set forth conclusions reached during a conference with personnel of BAT, BWCM, BE, and TRO-DSP on August 7, 1979 at 10:30 a.m. Personnel involved are listed below:

A. J. Anthony	- BAT
J. R. Bell	- BAT
Dale F. Jones	- BWCM
Burton R. Tuxford	- BWCM
Anne Field	- BE
G. T. Yagel	- TRO-DSP

1. VIMS model of Cockrell Creek has been verified and will be utilized as the basis for wasteload allocation of the total loading from these menhaden industries during the drafting of limitations for reissued permits.
2. In accordance with the VIMS model, 5,000 pounds per day of carbonaceous BOD is the total limit allowable for all discharges into Cockrell Creek in order that 5.0 mg/l of DO will be maintained in the upper layer of that receiving stream. 100 pounds per day of that total will be reserved for the Reedville Sanitary District sewage treatment facilities in order that growth may be allowed, leaving the industries with 4,900 pounds per day.
3. The 4,900 pounds total loading is considered a daily average and not a daily maximum.
4. The upper layer of Cockrell Creek, as identified in the VIMS model will be used to determine wasteload allocation which is agreed to by BWCM.

Omega Fact Sheet

File - Kilmarnock Office
Cockrell Creek Wasteload Allocation
Page 2
August 15, 1979

5. Suspended Solids loading will be reduced in the reissued permits by the same proportion as the CBOD5.
6. Net loading methodology used in the past for calculating daily loading from each industry will be deleted.
7. Alteration of the water quality standards now applicable to Cockrell Creek can only be accomplished in accordance with Section .35.1550 appearing in the Federal Register/Volume 44 No. 101/Wednesday, May 23, 1979. It was Anne Field's opinion that relaxation of existing standards could be accomplished only if economic data, provided by each industry, demonstrated that compliance with wasteload allocations planned would necessitate termination of the operations of these industries.
8. After considering all alternatives for allocation methodology, it was decided that productivity capability of each industry would be used as the basis for determining the percentage of allowable loading of waste to be allocated to each industry during the drafting of permit limits for permit reissuance. TRO-DSP personnel will confer with the management of each industry on August 20, 1979 for the purpose of explaining the allocation methodology agreed upon in securing production capacity data.
9. In response to F. K. Cunningham and G. T. Yagel's memorandum to Dale Jones, dated August 6, 1979, comments from Dale Phillips regarding the approach planned for wasteload allocation and the use of the VIMS model are expected prior to August 20, 1979.

The writer is anticipating that at least one of these industries may be requesting a hearing before the Board after they receive notice of the allocation offered them, for the purpose of contesting our decision in accordance with the provisions of Regulation #6 and the current NPDES Permit Issuance Manual. During that hearing, economic data may be provided by each or both of these industries. That data probably should include dollar value of the final product exported from each of these plants to their markets, other socio-economic factors, which only the industries can provide, number of employees affected by possible termination of production, and production data for the 1973-1974 seasons as compared to that data available for the 1977-1978 production seasons.

/bj

HYDROGRAPHY AND HYDRODYNAMICS
OF VIRGINIA ESTUARIES

IX. Mathematical Water Quality Study of Great
Wicomico River and Cockrell Creek

by

P. V. Hyer
J. Jacobson

PREPARED UNDER

THE COOPERATIVE STATE AGENCIES PROGRAM

OF

THE VIRGINIA STATE WATER CONTROL BOARD AND
THE VIRGINIA INSTITUTE OF MARINE SCIENCE

Project Officers

Dale Jones
Michael Bellanca

Virginia State Water Control Board

Special Report No. 120
in Applied Marine Science and
Ocean Engineering

Virginia Institute of Marine Science
Gloucester Point, Virginia 23062

William J. Hargis, Jr.
Director

September 1976

III. Description of Study Area

The drainage area of the Great Wicomico River takes in a portion of Northumberland County (see figure 1). This region is rural, with about half the land area covered by forest. Farming, commercial fishing and fish processing are the financial mainstays for the area.

Mean daily minimum temperatures are approximately thirty degrees and sixty-nine degrees Fahrenheit (minus one and twenty-one degrees Celsius) for January and July, respectively. The corresponding mean daily maximum temperatures are forty-eight degrees and eighty-eight degrees Fahrenheit respectively (nine and thirty-one degrees Celsius). Precipitation in the drainage basin exceeds forty-six inches (117 cm) per year. Autumn is drier than the rest of the year. Precipitation in the summer tends to occur as brief, heavy thundershowers, rather than as the more prolonged storms that occur throughout the rest of the year.

The Great Wicomico River empties directly into Chesapeake Bay. The land area of the drainage basin is only 70.6 square miles (182.8 km^2), resulting in relatively little freshwater inflow to the river. Tidal action is also weak, with the tidal current amplitude being on the order of 0.5 ft/sec (15 cm/sec) or less. Since the stream is short, there is very little time lag in the upstream propagation of the tidal wave.

Cockrell Creek is a tributary to the Great Wicomico. The creek empties into the river close to the river mouth. The creek has characteristics similar to the river; small drainage area (4.6 square miles, or 11.9 km^2) weak tidal action and low freshwater input. Two fish processing plants as well as the town of Reedville are located on Cockrell Creek. During the summer, the two plants introduce a total of about 5000 lb/day (2300 kg/day) of five-day carbonaceous BOD and about 900 lb/day (410 kg/day) of organic nitrogen and ammonia (as N).

Attachment 6 – Inspection Report



COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE

L. Preston Bryant, Jr.
Secretary of Natural Resources

4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

David K. Paylor
Director

November 17, 2009

Mr. Robert La Bruzzo,
General Manager
Omega Protein, Inc.
PO Box 175
Reedville, VA 22539

Re: Wastewater Facility and Laboratory Inspections, VPDES Permit No. VA0003867 – Omega Protein, Inc.

Dear Mr. La Bruzzo,

Enclosed are the reports resulting from the subject inspections performed on November 5, 2009. Please review the reports carefully especially the “**General Recommendations**” and “**Compliance Recommendations**” on page 5 of the Facility Inspection Report and the “**Deficiencies**” on page 3 of the Laboratory Inspection Report.

Please provide a written response to the recommendations, citing corrective actions, within 30 days of receipt of this letter.

If you have questions regarding the reports, please contact me at (804) 527-5055.

Sincerely,

A handwritten signature in black ink that reads "Mike Dare".

Mike Dare
Water Inspector

Enclosure

CC: DEQ – File
T. Schultz - Omega
S. Stell
EPA

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

Wastewater Facility Inspection Report

Facility Name:	<u>Omega Protein, Inc.</u>			Facility No.:	<u>VA0003867</u>	
City/County:	<u>Northumberland</u>			Inspection Agency:	<u>DEQ</u>	
Inspection Date:	<u>November 5, 2009</u>			Date Form Completed:	<u>November 10, 2009</u>	
Inspector:	<u>Mike Dare M) 11-10-09</u>			Time Spent:	<u>12 hrs. w/ travel & report</u>	
Reviewed By:	<u>Mew 11/13/09 Kw 11/13/09</u>			Unannounced Insp.?	<u>Yes</u>	
				FY-Scheduled Insp.?	<u>Yes</u>	
Present at Inspection:	<u>Ted Schultz</u>					
TYPE OF FACILITY:						
<u>Domestic</u>			<u>Industrial</u>			
<input type="checkbox"/> Federal	<input type="checkbox"/> Major		<input checked="" type="checkbox"/> Major	<input type="checkbox"/> Primary		
<input type="checkbox"/> Non-Federal	<input type="checkbox"/> Minor		<input type="checkbox"/> Minor	<input type="checkbox"/> Secondary		
Population Served:	<u>approx.: (N/A)</u>					
Number of Connections:	<u>approx.: (N/A)</u>					
TYPE OF INSPECTION:						
<input checked="" type="checkbox"/> Routine	Date of last inspection: <u>August 5, 2008</u>					
<input type="checkbox"/> Compliance	Agency: <u>DEQ/PRO</u>					
<input type="checkbox"/> Reinspection						
EFFLUENT MONITORING: See Discharge Monitoring Reports (DMR) in file						
Last month average:	BOD:	mg/L	TSS:	mg/L	Flow:	MGD
(Influent) Date:						
Other:						
Last month:	BOD:	mg/L	TSS:	mg/L	Flow:	MGD
(Effluent) Date:						
Other:						
Quarter average:	BOD:	mg/L	TSS:	mg/L	Flow:	MGD
(Effluent) Date:						
Other:						
CHANGES AND/OR CONSTRUCTION						
DATA VERIFIED IN PREFACE	<input type="checkbox"/>	Updated	<input type="checkbox"/> No changes <u>see below</u>			
Has there been any new construction?	<input checked="" type="checkbox"/>	Yes*	<input type="checkbox"/>	No		
If yes, were plans and specifications approved?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No*	<input type="checkbox"/>	N/A
DEQ approval date:	<u>Lagoons discharge to new DAF and UV units.</u>					

(A) PLANT OPERATION AND MAINTENANCE

1. Class and number of licensed operators: Class I – 0, Class II – 0, Class III – 1, Class IV – 0, Trainee - 0
2. Hours per day plant is staffed: WWTF: on site 4 hrs; monitored via computer 24/7
3. Describe adequacy of staffing: Good Average Poor*
4. Does the plant have an established program for training personnel? Yes No
5. Describe the adequacy of the training program: Good Average Poor*
6. Are preventive maintenance tasks scheduled? Yes No*
7. Describe the adequacy of maintenance: Good Average Poor*
8. Does the plant experience any organic/hydraulic overloading? Yes* No
- If yes, identify cause and impact on plant: N/A
9. Any bypassing since last inspection? Yes* No
10. Is the on-site electric generator operational? Yes No* N/A
11. Is the STP alarm system operational? Yes No * N/A
12. How often is the standby generator exercised?
Power Transfer Switch? Weekly Monthly Other: N/A
Alarm System? Weekly Monthly Other: N/A
13. When were the cross connection control devices last tested on the potable water service? 2 units last tested 4/09
14. Is sludge disposed in accordance with the approved sludge disposal plan? Yes No* N/A
15. Is septage received by the facility? Yes No
Is septage loading controlled? Yes No * N/A
Are records maintained? Yes No* N/A
16. Overall appearance of facility: Good Average Poor*

Comments: #4 Training consists of on-the-job training. #14 – It is noted that the sludge holding lagoon is nearing capacity.

(B) PLANT RECORDS

1. Which of the following records does the plant maintain?
- | | | | |
|---|---|------------------------------|---|
| Operational Logs for each unit process | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Instrument maintenance and calibration | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Mechanical equipment maintenance | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Industrial waste contribution (Municipal Facilities) | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
2. What does the operational log contain?
- | | | | |
|----------------------|---|--|---|
| Visual Observations | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | <input type="checkbox"/> N/A |
| Flow Measurement | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Laboratory Results | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> N/A |
| Process Adjustments | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Control Calculations | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input checked="" type="checkbox"/> N/A |
| Other: | <u>N/A</u> | | |
3. What do the mechanical equipment records contain?
- | | | | |
|-----------------------------|---|------------------------------|------------------------------|
| As built plans and specs? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Spare parts inventory? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Manufacturers instructions? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Equipment/parts suppliers? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Lubrication schedules? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Other: | <u>N/A</u> | | |
| Comments: | <u>None</u> | | |
4. What do the industrial waste contribution records contain?
- | | | | |
|--|------------------------------|------------------------------|---|
| <i>(Applicable to municipal facilities only)</i> | | | |
| Waste characteristics? | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
| Locations and discharge types? | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
| Impact on plant? | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
| Other: | <u>N/A</u> | | |
| Comments: | <u>None</u> | | |
5. Are the following records maintained at the plant?
- | | | | |
|--------------------------------|---|------------------------------|---|
| Equipment maintenance records | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Operational Log | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Industrial contributor records | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input checked="" type="checkbox"/> N/A |
| Instrumentation records | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| Sampling and testing records | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
6. Are records maintained at a different location?
- | | | | |
|-----------------------------------|-----------------------------------|--|--|
| Where are the records maintained? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | |
| | <u>All are available on site.</u> | | |
7. Were the records reviewed during the inspection
- | | | | |
|--|------------------------------|--|--|
| | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | |
|--|------------------------------|--|--|
8. Are the records adequate and the O & M Manual current?
- | | | | |
|---|------------------------------|------------------------------|--|
| O&M Manual date written: <u>July 27, 1998 with subsequent updates</u> | <input type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A <u>Not reviewed</u> |
|---|------------------------------|------------------------------|--|
- Date DEQ approved O&M: April 6, 2006
9. Are the records maintained for required 3-year period?
- | | | | |
|--|---|------------------------------|--|
| | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | |
|--|---|------------------------------|--|

Comments: A process control system has been installed. Plant records are maintained either electronically or by hand.

(C) SAMPLING

- | | | | |
|--|---|------------------------------|------------------------------|
| 1. Are sampling locations capable of providing representative samples? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 2. Do sample types correspond to those required by the permit? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 3. Do sampling frequencies correspond to those required by the permit? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 4. Are composite samples collected in proportion to flow? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 5. Are composite samples refrigerated during collection? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 6. Does plant maintain required records of sampling? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |
| 7. Does plant run operational control tests? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No* | <input type="checkbox"/> N/A |

Comments:**(D) TESTING**

1. Who performs the testing? Plant/ Lab
 Central Lab
 Commercial Lab - Name: Air, Water & Soil and CBI Laboratories

If plant performs any testing, complete 2-4.

- | | |
|---|---|
| 2. What method is used for chlorine analysis? | <u>N/A</u> |
| 3. Is sufficient equipment available to perform required tests? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A |
| 4. Does testing equipment appear to be clean and/or operable? | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No* <input type="checkbox"/> N/A |

Comments: Please see enclosed DEQ Laboratory Inspection Report.**(E) FOR INDUSTRIAL FACILITIES W/ TECHNOLOGY BASED LIMITS**

1. Is the production process as described in the permit application? (If no, describe changes in comments)
 Yes No* N/A
2. Do products and production rates correspond to the permit application? (If no, list differences in comments section)
 Yes No* N/A
3. Has the State been notified of the changes and their impact on plant effluent?
 Yes No* N/A

Comments: None

FOLLOW UP TO COMPLIANCE RECOMMENDATIONS FROM THE AUGUST 5, 2008 DEQ INSPECTION:

1. There were no compliance recommendations from the August 5, 2008 DEQ inspection.

FOLLOW UP TO GENERAL RECOMMENDATIONS FROM THE AUGUST 5, 2008 DEQ INSPECTION:

1. There were no general recommendations from the August 5, 2008 DEQ inspection.

INSPECTION REPORT SUMMARY**Compliance Recommendations/Request for Corrective Action:**

1. A Certificate to Operate (CTO) must be obtained for the newly installed DAF and UV units. Contact Ms. Denise Mosca at this office if further instruction is required.
2. Ensure that at least a 1 foot freeboard is maintained when solids from the DAF unit are applied to the sludge holding lagoon. (Dried solids were noted at the time of inspection above the one foot freeboard line.)

General Recommendations/Observations:

1. The sludge holding lagoon reportedly may be at capacity by the end of 2010. A plan should be developed **now** for the handling of solids produced at the facility once the lagoon reaches capacity.

Comments:

Omega Protein, Inc. is a producer of fish oil and fish meal. The oils are stored in above ground storage tanks which are protected by spill containment dikes. Containment areas also protect fuel oil and diesel above ground storage tanks. Best Management Practices (BMP) compliance reports are submitted along with the Discharge Monitoring Report (DMR). Swift Creek Environmental performs ground water monitoring. Vessel repair work is performed by contractor at an off site location. The flame dryer and associated air scrubber have been removed from service. This action has allowed for the elimination of any discharge from outfall 001, which included a potential cyanide component. Fish processing is now performed utilizing existing steam driers in conjunction with a new airless dryer. Lagoons discharge to new DAF and UV units, installed to meet permit compliance schedules for total phosphorus, fecal coliform and enterococci at outfall 002.

Areas of emphasis (Compliance Assessment) – check all that apply:

[x] Yes	[] No	Operational Units
[] Yes	[x] No	Evaluation of O & M Manual
[] Yes	[x] No	Maintenance Records
[] Yes	[] No	[x] N/A Pathogen Reduction & Vector Attraction Reduction
[x] Yes	[] No	[] N/A Sludge Disposal Plan
[x] Yes	[] No	[] N/A Groundwater Monitoring Plan
[] Yes	[x] No	[] N/A Storm Water Pollution Prevention Plan (See SWPPP Reports)
[x] Yes	[] No	[] N/A Permit Special Conditions
[] Yes	[x] No	[] N/A Permit Water Quality Chemical Monitoring
[x] Yes	[] No	[] N/A Laboratory Records (see Lab Report)

UNIT PROCESS: Ponds/Lagoons

1. Type:	<input checked="" type="checkbox"/> Aerated	<input type="checkbox"/> Unaerated	<input type="checkbox"/> Polishing	
2. No. of cells: Number in Operation:	<u>2</u> <u>2</u>			
3. Color:	<input type="checkbox"/> Green <input checked="" type="checkbox"/> Other	<input type="checkbox"/> D. Brown <i>clear to light green</i>	<input type="checkbox"/> L. Brown	<input type="checkbox"/> Grey
4. Odor:	<input type="checkbox"/> Septic *	<input type="checkbox"/> Earthy	<input checked="" type="checkbox"/> None	
	<input type="checkbox"/> Other:			
5. System operated in:	<input checked="" type="checkbox"/> Series	<input type="checkbox"/> Parallel	<input type="checkbox"/> N/A	
6. If aerated, are lagoon contents mixed adequately?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *	<input type="checkbox"/> N/A	
7. If aerated, is aeration system operating properly?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *	<input type="checkbox"/> N/A	
8. Evidence of following problems:				
a. Vegetation in lagoon or dikes?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
b. Rodents burrowing on dikes?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
c. Erosion?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
d. Sludge bars?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
e. Excessive foam?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
f. Floating material?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
9. Fencing intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *		
10. Grass maintained properly:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
11. Level control valves working properly?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *	<input type="checkbox"/> N/A	
12. Effluent discharge elevation:	<input checked="" type="checkbox"/> Top	<input type="checkbox"/> Middle	<input type="checkbox"/> Bottom	
13. Available freeboard:	<u>approx. 3 ft.</u>			
14. Appearance of effluent:	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor *	<input type="checkbox"/> N/A
15. Are monitoring wells present? Are wells adequately protected from runoff? Are caps on and secured?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> No * <input type="checkbox"/> No *	<input type="checkbox"/> N/A <input type="checkbox"/> N/A <input type="checkbox"/> N/A	
16. General condition:	<input checked="" type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor*	

Comments: The two aerated lagoons operate in series and receive condensate water from the evaporators. The plant evaporators are occasionally cleaned with H₂SO₄ or HNO₃. This cleaning solution is placed in a tank and metered into the lagoon system. Each lagoon has a curtain to improve biological treatment and extend retention time. Nitrifying bacteria (Nitrobacter and Nitrosomonas) are added near the influent to the first lagoon. A backup generator allows aeration to continue during power outages. #9 – A couple of gaps, used for lagoon access, noted in perimeter fencing.

UNIT PROCESS: Sludge Holding Lagoon

1. Type:	<input type="checkbox"/> Aerated	<input checked="" type="checkbox"/> Unaerated	<input type="checkbox"/> Polishing	
2. No. of cells: Number in Operation:	<u>1</u>			
3. Color:	<input checked="" type="checkbox"/> Green	<input type="checkbox"/> D. Brown	<input type="checkbox"/> L. Brown	<input type="checkbox"/> Grey
4. Odor:	<input type="checkbox"/> Septic *	<input type="checkbox"/> Earthy	<input checked="" type="checkbox"/> None	
	<input type="checkbox"/> Other:			
5. System operated in:	<input type="checkbox"/> Series	<input type="checkbox"/> Parallel	<input checked="" type="checkbox"/> N/A	
6. If aerated, are lagoon contents mixed adequately?	<input type="checkbox"/> Yes	<input type="checkbox"/> No *	<input checked="" type="checkbox"/> N/A	
7. If aerated, is aeration system operating properly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No *	<input checked="" type="checkbox"/> N/A	
8. Evidence of following problems:				
a. Vegetation in lagoon or dikes?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
b. Rodents burrowing on dikes?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
c. Erosion?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
d. Sludge bars?	<input checked="" type="checkbox"/> Yes *	<input type="checkbox"/> No		
e. Excessive foam?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
f. Floating material?	<input type="checkbox"/> Yes *	<input checked="" type="checkbox"/> No		
9. Fencing intact?	<input type="checkbox"/> Yes	<input type="checkbox"/> No *	Not fenced	
10. Grass maintained properly:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
11. Level control valves working properly?	<input type="checkbox"/> Yes	<input type="checkbox"/> No *	<input checked="" type="checkbox"/> N/A	
12. Effluent discharge elevation:	<input type="checkbox"/> Top	<input type="checkbox"/> Middle	<input type="checkbox"/> Bottom	<input checked="" type="checkbox"/> N/A
13. Available freeboard:	<u>approx. 2 ft.</u>			
14. Appearance of effluent:	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor *	<input checked="" type="checkbox"/> N/A
15. Are monitoring wells present? Are wells adequately protected from runoff? Are caps on and secured?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No		
	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *	<input type="checkbox"/> N/A	
	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No *	<input type="checkbox"/> N/A	
16. General condition:	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input checked="" type="checkbox"/> Poor*	

Comments: Though sludge from the aerated lagoons has not been added to this sludge holding lagoon since approximately January 2006 solids from a recently installed DAF unit have been added. There is a sludge bar (from previous aerated lagoon sludge additions) visible at the center. Dried solids were noted at the time of inspection above the one foot freeboard line.

UNIT PROCESS: Flow MeasurementOutfall 002

<input type="checkbox"/> Influent	<input type="checkbox"/> Intermediate	<input checked="" type="checkbox"/> Effluent
-----------------------------------	---------------------------------------	--

1. Type measuring device: 90° v-notch weir w/ultrasonic sensor

2. Present reading: Not obtained

3. Bypass channel? Yes No
Metered? Yes No* N/A

4. Return flows discharged upstream from meter? Yes No
If Yes, identify:

5. Device operating properly? Yes No*

6. Date of last calibration: 4/28/09

7. Evidence of following problems:
 - a. Obstructions? Yes* No
 - b. Grease? Yes* No

8. General condition: Good Fair Poor*

Comments: Effluent from the aerated lagoons flows through new DAF and UV units before discharging to outfall 002. The automatic sampler at this location is tied into the flow meter for flow proportional sampling. At the time of inspection, the discharge at outfall 002 was clear with a small number of tiny flecks of solids (probably algae). Sampling of O/F 002 by M. Dare at 1140 hrs. – pH: 6.22 SU, 16.7 deg C.

UNIT PROCESS: Flow MeasurementOutfall 995

<input type="checkbox"/> Influent	<input type="checkbox"/> Intermediate	<input checked="" type="checkbox"/> Effluent
-----------------------------------	---------------------------------------	--

1. Type measuring device: None
2. Present reading: Based on pump run times
3. Bypass channel?
Metered?

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
<input type="checkbox"/> Yes	<input type="checkbox"/> No*	<input checked="" type="checkbox"/> N/A
4. Return flows discharged upstream from meter?
If Yes, identify: N/A

<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
------------------------------	--
5. Device operating properly?

<input type="checkbox"/> Yes	<input type="checkbox"/> No*	<input checked="" type="checkbox"/> N/A
------------------------------	------------------------------	---
6. Date of last calibration: N/A
7. Evidence of following problems:
 - a. Obstructions?

<input type="checkbox"/> Yes*	<input checked="" type="checkbox"/> No
-------------------------------	--
 - b. Grease?

<input type="checkbox"/> Yes*	<input checked="" type="checkbox"/> No
-------------------------------	--
8. General condition:

<input checked="" type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor*
--	-------------------------------	--------------------------------

Comments: Non-contact cooling water discharges through this outfall. There was no discharge from outfall 995 at the time of inspection.

UNIT PROCESS: Flow MeasurementOutfall 001

<input type="checkbox"/> Influent	<input type="checkbox"/> Intermediate	<input type="checkbox"/> Effluent
-----------------------------------	---------------------------------------	-----------------------------------

1. Type measuring device:

2. Present reading:

3. Bypass channel? Yes No
Metered? Yes No* N/A

4. Return flows discharged upstream from meter? Yes No
If Yes, identify:

5. Device operating properly? Yes No* N/A

6. Date of last calibration:

7. Evidence of following problems:
 - a. Obstructions? Yes* No
 - b. Grease? Yes* No

8. General condition: Good Fair Poor*

Comments: The flame dryer and associated air scrubber have been removed from service. This action has allowed for the elimination of any discharge from outfall 001, which included a potential cyanide component. Fish processing is now performed utilizing existing steam driers in conjunction with a new airless dryer.

UNIT PROCESS: Effluent/Plant Outfall

1. Type outfall: Shore based (995) Submerged (002)
2. Type if shore based: Wingwall Headwall Rip Rap N/A
3. Flapper valve? Yes No
4. Erosion of bank? Yes* No N/A
5. Effluent plume visible? Yes * No

Comments: None

6. Condition of outfall and supporting structures: Good Fair Poor *
7. Final effluent, evidence of following problems:
- a. Oil sheen? Yes* No
 - b. Grease? Yes* No
 - c. Sludge bar? Yes* No
 - d. Turbid effluent? Yes* No
 - e. Visible foam? Yes* No
 - f. Unusual odor? Yes* No

Comments: At the time of inspection, the discharge at outfall 002 was clear with a small number of tiny flecks of solids (probably algae); there was no discharge from outfall 995. (Sampling of O/F 002 by M. Dare at 1140 hrs. – pH: 6.22 SU, 16.7 deg C.) Bailwater (water used to remove fish from ship holds) is hauled by ship and discharged in the Atlantic Ocean. Refrigeration water is discharged in the Bay according to Permit requirements.

CC:

- Owner: c/o Mr. Robert La Bruzzo - General Manager
- Operator: Ted Schultz
- Local Health Department:
- VDH Engineering Field Office: Field Office
- VDH/Central Office - DWE
- DEQ - OWCP
- DEQ - Regional Office File
- EPA - Region III

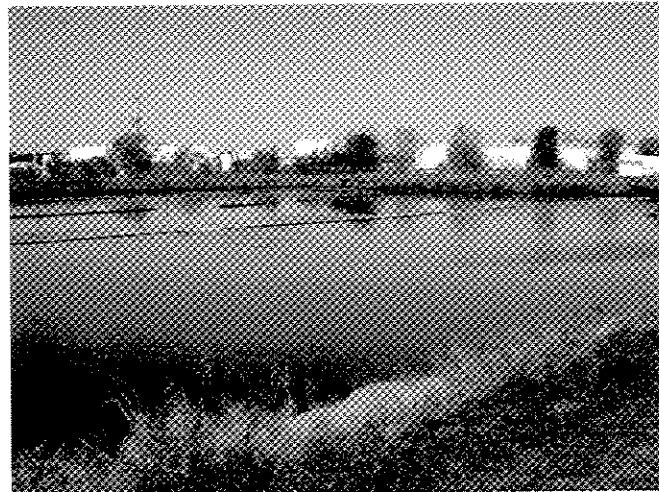
INSPECTION PHOTOS



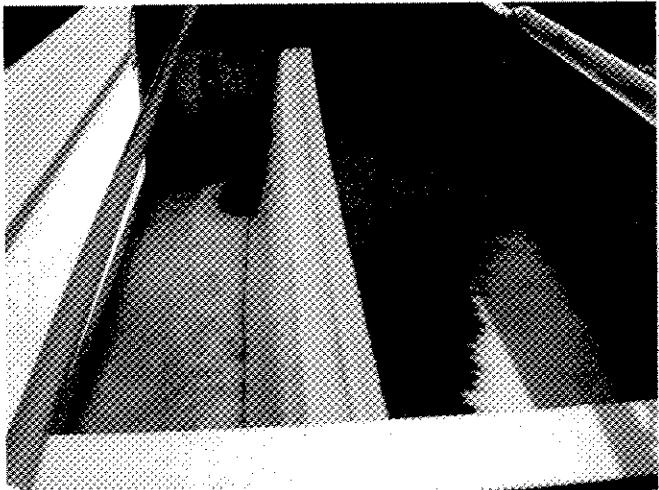
Non-contact cooling water discharges from pipe to O/F 995



First of two in-series treatment lagoons



Second of two in-series treatment lagoons



Lagoon effluent flows through new DAF and UV units before discharging to outfall 002. Photo is of discharge from new DAF unit.



Solids discharge from new DAF unit



Solids from new DAF unit now routinely applied to Sludge lagoon

**DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
LABORATORY INSPECTION REPORT**

Form Updated 10/4/2001

LABORATORY RECORDS SECTION

LABORATORY RECORDS INCLUDE THE FOLLOWING:

<input checked="" type="checkbox"/>	SAMPLING DATE	<input checked="" type="checkbox"/>	ANALYSIS DATE	<input type="checkbox"/> N/A	CONT MONITORING CHART
<input checked="" type="checkbox"/>	SAMPLING TIME	<input checked="" type="checkbox"/>	ANALYSIS TIME	<input checked="" type="checkbox"/>	INSTRUMENT CALIBRATION
<input checked="" type="checkbox"/>	SAMPLE LOCATION	<input checked="" type="checkbox"/>	TEST METHOD	<input checked="" type="checkbox"/>	INSTRUMENT MAINTENANCE

 CERTIFICATE OF ANALYSIS

WRITTEN INSTRUCTIONS INCLUDE THE FOLLOWING:

<input checked="" type="checkbox"/>	SAMPLING SCHEDULES	<input checked="" type="checkbox"/>	CALCULATIONS	<input checked="" type="checkbox"/>	ANALYSIS PROCEDURES	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> N/A
	DO ALL ANALYSTS INITIAL THEIR WORK?				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
	DO BENCH SHEETS INCLUDE ALL INFORMATION NECESSARY TO DETERMINE RESULTS?				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
	IS THE DMR COMPLETE AND CORRECT? MONTH(S) REVIEWED:				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
					VA0003867 and VAN020037 - September 2009			
	ARE ALL MONITORING VALUES REQUIRED BY THE PERMIT REPORTED?				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		

GENERAL SAMPLING AND ANALYSIS SECTION

<input type="checkbox"/>		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> N/A
	ARE SAMPLE LOCATION(S) ACCORDING TO PERMIT REQUIREMENTS?	<input checked="" type="checkbox"/>		
	ARE SAMPLE COLLECTION PROCEDURES APPROPRIATE?	<input checked="" type="checkbox"/>		
	IS SAMPLE EQUIPMENT CONDITION ADEQUATE?	<input checked="" type="checkbox"/>		
	IS FLOW MEASUREMENT ACCORDING TO PERMIT REQUIREMENTS?	<input checked="" type="checkbox"/>		
	ARE COMPOSITE SAMPLES REPRESENTATIVE OF FLOW?	<input checked="" type="checkbox"/>		
	ARE SAMPLE HOLDING TIMES AND PRESERVATION ADEQUATE?	<input checked="" type="checkbox"/>		
	IF ANALYSIS IS PERFORMED AT ANOTHER LOCATION, ARE SHIPPING PROCEDURES ADEQUATE? LIST PARAMETERS AND NAME & ADDRESS OF LAB: Air, Water and Soil, Labortories, Inc., Richmond, VA - BOD, TSS, TKN, NH3, NO2/NO3, NO3, Total N, Ortho & Total P, Oil & Grease, Cyanide, Fecal Coliform, Enterococci, TOC, Copper, Silver, Zinc, Aluminum; CBI Laboratories, Gloucester, VA – Toxicity testing.	<input checked="" type="checkbox"/>		

LABORATORY EQUIPMENT SECTION

<input type="checkbox"/>		<input type="checkbox"/> YES	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> N/A
	IS LABORATORY EQUIPMENT IN PROPER OPERATING RANGE?	<input checked="" type="checkbox"/>		
	ARE ANNUAL THERMOMETER CALIBRATION(S) ADEQUATE?		<input checked="" type="checkbox"/>	
	IS THE LABORATORY GRADE WATER SUPPLY ADEQUATE?			<input checked="" type="checkbox"/>
	ARE ANALYTICAL BALANCE(S) ADEQUATE?			<input checked="" type="checkbox"/>

LABORATORY INSPECTION REPORT SUMMARY

FACILITY NAME: Omega Protein, Inc.	FACILITY NO: VA0003867	INSPECTION DATE: November 5, 2009
OVERALL LABORATORY EVALUATION:	(x) Deficiencies () No Deficiencies	

LABORATORY RECORDS

VA0003867, September 2009 DMR for outfall 002

When calculating BOD, use "0" in calculations for values <QL (5 mg/L).

When calculating the geomean for fecal coliform, use 1 for values that are <1.

When calculating total phosphorus, use "0" in calculations for values <QL (0.1 mg/L).

There is no QL for oil and grease. Report laboratory results on DMR.

VA0003867, September 2009 DMR for outfall 995

The QL for total copper is 7.4 ug/L. Report values less than this as "<QL."

The QL for dissolved zinc is 72 ug/L. Report values less than this as "<QL."

Because the above issues are minor, a resubmittal of the DMR's is not required.

VAN020037, September 2009 DMR for outfall 501

The QL is the lowest standard in the calibration curve for a given analyte. If a value is <QL, use ½ the QL in calculations.

Express concentration to the nearest 0.01 mg/L. Use 8.3438 lbs/gal as conversion factor. Express flow to nearest

0.01 MGD. Round daily loads to nearest whole number.

VAN020037, September 2009 DMR for outfall 502

The QL is the lowest standard in the calibration curve for a given analyte. If a value is <QL, use ½ the QL in calculations.

Express concentration to the nearest 0.01 mg/L. Use 8.3438 lbs/gal as conversion factor. Express flow to nearest

0.01 MGD. Round daily loads to nearest whole number except if zero; in which case it is recommended that daily loads are left as is and then rounded for monthly load.

- 1. Using Nutrient General Permit Guidelines, please recalculate and resubmit Nutrient General DMR's for 2009, for outfalls 501, 502 and 500 (total of outfalls 501 & 502).**

GENERAL SAMPLING AND ANALYSIS

None

LABORATORY EQUIPMENT

- 1. Begin maintaining a daily log of sample refrigerator and auto sampler temperatures.**

INDIVIDUAL PARAMETERS

None

COMMENTS

None

ANALYST:	Ted Schultz	VPDES NO	VA0003867
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Meter: Symphony VWR

Parameter: Hydrogen Ion (pH)

1/08

Method: Electrometric

METHOD OF ANALYSIS:

X	18 th Edition of Standard Methods – 4500-H ⁺ B
	21 st or Online Editions of Standard Methods – 4500-H ⁺ B (00)

pH is a method-defined analyte so modifications are not allowed. [40 CFR Part 136.6]		Y	N
1)	Is a certificate of operator competence or initial demonstration of capability available for <u>each analyst/operator</u> performing this analysis? NOTE: Analyze 4 samples of known pH. May use external source of buffer (different lot/manufacturer than buffers used to calibrate meter). Recovery for each of the 4 samples must be +/- 0.1 SU of the known concentration of the sample. [SM 1020 B.1]	X	
2)	Is the electrode in good condition (no chloride precipitate, scratches, deterioration, etc.)? [2.b/c and 5.b]	X	
3)	Is electrode storage solution in accordance with manufacturer's instructions? [Mfr.]	X	
4)	Is meter calibrated on at least a daily basis using three buffers all of which are at the same temperature? [4.a] NOTE: Follow manufacturer's instructions.	X	
5)	After calibration, is a buffer analyzed as a check sample to verify that calibration is correct? Agreement should be within +/- 0.1 SU. [4.a]	X	
6)	Do the buffer solutions appear to be free of contamination or growths? [3.1]	X	
7)	Are buffer solutions within the listed shelf-life or have they been prepared within the last 4 weeks? [3.a]	X	
8)	Is the cap or sleeve covering the access hole on the reference electrode removed when measuring pH? [Mfr.]	GEL	N/A
9)	For meters with ATC that also have temperature display, is the thermometer verified annually? [SM 2550 B.1]		X
10)	Is temperature of buffer solutions and samples recorded when determining pH? [4.a]		X
11)	Is sample analyzed within 15 minutes of collections? [40 CFR Part 136]	In-situ	
12)	Is the electrode rinsed and then blotted dry between reading solutions (Disregard if a portion of the next sample analyzed is used as the rinsing solution.)? [4.a]		X
13)	Is the sample stirred gently at a constant speed during measurement? [4.b]	In-situ	
14)	Does the meter hold a steady reading after reaching equilibrium? [4.b]		X
15)	Is a duplicate sample analyzed after every 20 samples if citing 18 th or 19 th Edition or daily for 20 th or 21 st Edition? [Part 1020] NOTE: Not required for <i>in situ</i> samples.		N/A
16)	Is the pH of duplicate samples within 0.1SU of the original sample? [Part 1020]		N/A
17)	Is there a written procedure for which result will be reported on DMR (Sample or Duplicate) and is this procedure followed? [DEQ]		N/A

PROBLEMS: None

**DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
SAMPLE ANALYSIS HOLDING TIME/CONTAINER/PRESERVATION CHECK SHEET**

Revised 3/08 [40 CFR, Part 136.3, Table II]

November 5, 2009

Omega Protein, Inc.

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
EQUIPMENT TEMPERATURE LOG/THERMOMETER VERIFICATION CHECK SHEET

1/08

FACILITY NAME:	Omega Protein, Inc.			VPDES NO:	VA0003867	DATE:	November 5, 2009
EQUIPMENT	RANGE	IN RANGE	INSPECT READING °C	CHECK & LOG DAILY	CORRECT INCREMENT	ANNUAL THERMOMETER VERIFICATION	
		Y	N			Is the NIST / NIST-Traceable Reference Thermometer within the manufacturer's expiration date or recertified yearly?	
						DATE CHECKED	MARKED CORR FACTOR INSPECT TEMP °C
						Y	N °C
SAMPLE REFRIGER.	1-6°C	X	0.9 °C	X	X	8/19/09	X -0.2°C
AUTO SAMPLER	1-6°C	X	002 - 3.0°C	X	X	8/19/09	X 0°C
BOD INCUBATOR	20 ± 1°C						
SOLIDS DRYING OVEN	103-105°C						
WATER BATH	44.5 ± 2°C						
INCUBATOR	35± .5°C						
AUTOCLAVE	121°C IN 30 MIN						
HOT AIR STERILIZING	170 ± 10°C						
O & G WATER BATH	70± 2°C						
REAGENT REFRIGER.	1-6°C						
pH METER	± 1° C					8/18/09	X +0.1°C
DO METER	± 1° C						
THERMOMETER-OUTFALL	± 1° C						
Hg WATER BATH	95 °C						

Comments: Outfall 995 currently composited manually.
 Problems: Need to maintain daily log of sample refrigerator and auto sampler temperatures.

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)**

DEPT. OF
(F)

Piedmont Re
4949-A Cox

Glen Allen,

PERMITTEE NAME/ADDRESS (INCLUDE
FACILITY NAME/LOCATION IF DIFFERENT)

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville, VA 22539

FACILITY
LOCATION

610 Menhaden Rd

VA0003867	002						
PERMIT NUMBER	DISCHARGE NUMBER						
MONITORING PERIOD							
YEAR	MO	DAY	YEAR	MO	DAY		
FROM	2009	09	01	TO	2009	09	30

NOTE: REA
BEF

Parameter		Quantity or Loading			Quality or Concentration				No. EX.	Frequency of Analysis	Sample Type	Lab Code
		Average	Maximum	Units	Minimum	Average	Maximum	Units				
FLOW	REPORTD	0.161	0.258	MGD	*****	*****	*****		0	CONT	MEAS	
PARAM CODE: 001	REQRMNT	NL	NL		*****	*****	*****			CONT	MEAS	
PH	REPORTD	*****	*****	KG/D	6.12	*****	7.97	SU	0	2D/W	GRAB	
PARAM CODE: 002	REQRMNT	*****	*****		6.0	*****	9.0			2D/W	GRAB	
BOD5	REPORTD	14.5	26.9	KG/D	*****	*****	*****		0	2/M	24HC	
PARAM CODE: 003	REQRMNT	470	840		*****	*****	*****			2/M	24HC	
TSS	REPORTD	22	27	KG/D	*****	*****	*****		0	2/M	24HC	
PARAM CODE: 004	REQRMNT	160	410		*****	*****	*****			2/M	24HC	
COLIFORM, FECAL	REPORTD	*****	*****		*****	*****	*****	N/CMI	0	1/W	GRAB	
PARAM CODE: 006	REQRMNT	*****	*****		*****	NL	*****			1/W	GRAB	
PHOSPHORUS, TOTAL (AS P)	REPORTD	0.05	0.02	KG/D	*****	*****	*****	MGL	0	1/W	24HC	
PARAM CODE: 012	REQRMNT	1.9	1.9		*****	2.0	*****			1/W	24HC	
AMMONIA, AS N	REPORTD	*****	*****		*****	14.1	15.6	MGL	0	2/M	24HC	
PARAM CODE: 039	REQRMNT	*****	*****		*****	38	45			2/M	24HC	

GENERAL PERMIT REQUIREMENTS OR COMMENTS:

PARAMETER-SPECIFIC COMMENTS:

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW (M.G.)	TOTAL BOD5 (K.G.)	OPERATOR IN RESPONSIBLE CHARGE					
				TYPED OR PRINTED NAME		CERTIFICATE NUMBER			
0	0	0	Theodore Schultz	1911004868					
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT				TELEPHONE	804-453-4211				
TYPED OR PRINTED NAME				SIGNATURE			YEAR	MO.	DAY

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)**

DEPT. OF (F

Piedmont Re
4949-A Cox

Glen Allen,

PERMITTEE NAME/ADDRESS (INCLUDE
FACILITY NAME/LOCATION IF DIFFERENT)NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville, VA 22539

VA0003867	002
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

FROM	YEAR	MO	DAY	TO	YEAR	MO	DAY
	2009	09	01		2009	09	30

NOTE: REA
BEPIFACILITY
LOCATION 610 Menhaden Rd

Parameter		QUANTITY OR LOADING			QUALITY OR CONCENTRATION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	LAB CODE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM				
TEMPERATURE, WATER (DEG. C)	REPORTD	*****	*****		*****	24.8	28.2	C	0	2D/W	IS
PARAM CODE: 080	REQRMNT	*****	*****		*****	NL	NL			2D/W	IS
ENTEROCOCCI	REPORTD	*****	*****		*****	91.6	*****	N/CML	0	I/W	GRAB
PARAM CODE: 140	REQRMNT	*****	*****		*****	NL	*****			I/W	GRAB
OIL & GREASE	REPORTD	X/210	X/210	KG/D	*****	*****	*****		0	2/M	GRAB
PARAM CODE: 500	REQRMNT	25	40		*****	*****	*****			2/M	GRAB

GENERAL PERMIT REQUIREMENTS OR COMMENTS

PARAMETER-SPECIFIC COMMENTS

NO QL FOR O&G

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW (M.G.)	TOTAL BOD5 (K.G.)	OPERATOR IN RESPONSIBLE CHARGE				
				TYPED OR PRINTED NAME	CERTIFICATE NUMBER	PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE	
0	0	0	0	Theodore Schultz	1911004868		804-453-4211	
				TYPED OR PRINTED NAME	SIGNATURE	YEAR	MO.	DAY

(Handwritten signature over the signature line)

CERTIFY UNDER PENALTY OF PERJURY THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM. FOR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS TO THE BEST OF MY KNOWLEDGE AND BELIEF TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS. SEE 10 U.S.C. & 1001 AND 33 U.S.C. & 1319. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)

Page 4

VA0003867
Sep-09
O/F 002

DEQ check by M. Dare
Omega

date	flow O/F 002	BOD mg/l	TSS mg/l	BOD kg/d	TSS kg/d	temp Ecocci	fecal E. coli	date	flow O/F 002	BOD mg/l	TSS mg/l	BOD kg/d	TSS kg/d	temp Ecocci	fecal E. coli	
Sep-09	1	0.154				25	4	2420	1	0.154				25	4	2420
O/F 002	2	0.164				24.7			2	0.164				25.5		
	3	0.174				24.9			3	0.174				24.9		
	4	0.18				26			4	0.18				26		
	5	0.161				27.5			5	0.161				27.5		
	6	0.203				28.2			6	0.203				28.2		
	7	0.186				26.2			7	0.186				26.2		
	8	0.127				25.7			8	0.127				25.7		
	9	0.086				25.4			9	0.086				25.4		
	10	0.154				23.3			10	0.154				23.3		
	11	0.122				20.9			11	0.122				20.9		
	12	0.191							12	0.191						
	13								13							
	14								14							
	15	0.198							15	0.198						
	16	0.13							16	0.13						
	17	0.133							17	0.133						
	18	0.258							18	0.258						
	19	0.142							19	0.142						
	20								20							
	21								21							
	22	0.138							22	0.138						
	23	0.152							23	0.152						
	24	0.204							24	0.204						
	25	0.1							25	0.1						
	26	0.251							26	0.251						
	27	0.132							27	0.132						
	28	0.12							28	0.12						
	29	0.2							29	0.2						
	30	0.135							30	0.135						
		0.161								0.161						
		0.258								0.258						

Omega
VA0003867
Sep-09
O/F 002

DEQ check by M. Dare

	flow	TP mg/l	TP mg/l	TP kg/d	NH3 mg/l	
1	0.154					QL=1
2	0.164	0.18	0.18	3.785	0.11	
3	0.174					
4	0.18					
5	0.161					
6	0.203					
7	0.186					
8	0.127					
9	0.086					
10	0.154	0.08	0	0.00	15.6	6
11	0.122					
12	0.191					
13						
14						
15	0.198					
16	0.13					
17	0.133	0.06	0	0.00	12.6	5
18	0.258					
19	0.142					
20						
21						
22	0.138					
23	0.152	0.07	0	0.00		
24	0.204					
25	0.1					
26	0.251					
27	0.132					
28	0.12					
29	0.2					
30	0.135	0.06	0	0.00	14.1	5
	0.161	0.09	0.04	0.02	15.6	6
	0.258					

**COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
DISCHARGE MONITORING REPORT (DMR)**

DEPT. OF

(F

PERMITTEE NAME/ADDRESS (INCLUDE
FACILITY NAME/LOCATION IF DIFFERENT)Piedmont Re
4949-A Cox

Glen Allen,

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville, VA 22539

VA0003867	995
PERMIT NUMBER	DISCHARGE NUMBER

MONITORING PERIOD

FROM	YEAR	MO	DAY	TO	YEAR	MO	DAY
	2009	09	01		2009	09	30

NOTE: REA
BEFFACILITY
LOCATION 610 Menhaden Rd*QL = 7.4 ug/l*

Parameter		QUANTITY OR LOADING			QUALITY OR CONCENTRATION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE	LAB CODE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM				
FLOW	REPORTD	2.708	4.037	MGD	*****	*****	*****	0	CONT	EST	
PARAM CODE: 001	REQRMNT	NL	NL		*****	*****	*****		CONT	EST	
PH	REPORTD	*****	*****		6.91	*****	7.88	SU	SD/W	GRAB	
PARAM CODE: 002	REQRMNT	*****	*****		6.0	*****	9.0		SD/W	GRAB	
COPPER, TOTAL (AS CU)	REPORTD	*****	*****		*****	56	56	UG/L	1/M	24HC	
PARAM CODE: 019	REQRMNT	*****	*****		*****	NL	NL		1/M	24HC	
TEMPERATURE, WATER (DEG. C)	REPORTD	*****	*****		*****	30.5	34.8	C	1/DAY	IS	
PARAM CODE: 080	REQRMNT	*****	*****		*****	NL	45		1/DAY	IS	
SILVER, TOTAL RECOVERABLE	REPORTD	*****	*****		*****	<QE	<QL	UG/L	1/M	24HC	
PARAM CODE: 186	REQRMNT	*****	*****		*****	NL	NL		1/M	24HC	
ZINC, DISSOLVED (AS ZN) (UG/L)	REPORTD	*****	*****		*****	124	124	UG/L	1/M	GRAB	
PARAM CODE: 448	REQRMNT	*****	*****		*****	NL	NL		1/M	GRAB	

GENERAL PERMIT REQUIREMENTS OR COMMENTS:
PARAMETER-SPECIFIC COMMENTS*QL = 72 ug/l*

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW (M.G.)	TOTAL BOD5 (K.G.)	OPERATOR IN RESPONSIBLE CHARGE						
				TYPED OR PRINTED NAME		CERTIFICATE NUMBER				
I CERTIFY UNDER PENALTY OF LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED BASED ON MY INQUIRY OF THE PERSON OR PERSONS WHO MANAGE THE SYSTEM OR THOSE PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION. THE INFORMATION SUBMITTED IS TO THE BEST OF MY KNOWLEDGE AND BELIEF TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS SEE 18 U.S.C. & 1001 AND 33 U.S.C. & 1319 (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)				PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE	804-453-4211			
				TYPED OR PRINTED NAME		YEAR	MO.			
				SIGNATURE		DAY				

Page 7

DMR Parameter Calcs

002
2006

TKN	9/2/2009	0.164	24.600	24.680	*****	15.270	11.340
	9/10/2009	0.154	17.800	*****	*****	10.375	*****
	9/17/2009	0.133	14.700	*****	*****	7.400	*****
	9/23/2009	0.152	22.900	*****	*****	13.175	*****
	9/30/2009	0.135	25.400	*****	*****	12.979	*****
Total			105.400	*****	*****	59.199	*****
No. Weeks		5.000	*****	*****	*****	5.000	*****
 Nitrite + Nitrate	 9/2/2009	 0.164	 0.001	 0.398	 *****	 0.001	 0.209
	9/10/2009	0.154	0.001	*****	*****	0.001	*****
	9/17/2009	0.133	0.540	*****	*****	0.272	*****
	9/23/2009	0.152	0.450	*****	*****	0.259	*****
	9/30/2009	0.135	1.000	*****	*****	0.511	*****
Total			1.992	*****	*****	1.043	*****
No. Weeks		5.000	*****	*****	*****	5.000	*****
 Total Nitrogen	 9/2/2009	 0.164	 24.601	 24.727	 *****	 15.271	 12.346
	9/10/2009	0.154	17.801	*****	*****	10.376	*****
	9/17/2009	0.133	15.240	*****	*****	7.672	*****
	9/23/2009	0.152	23.350	*****	*****	13.434	*****
	9/30/2009	0.135	26.400	*****	*****	13.490	*****
Total			107.392	*****	*****	60.242	*****
No. Weeks		5.000	*****	*****	*****	5.000	*****
 o-PO4	 9/2/2009	 0.164	 0.001	 0.001	 *****	 0.001	 0.001
	9/10/2009	0.154	0.001	*****	*****	0.001	*****
	9/17/2009	0.133	0.001	*****	*****	0.001	*****
	9/23/2009	0.152	0.001	*****	*****	0.001	*****
	9/30/2009	0.135	0.001	*****	*****	0.001	*****
Total			0.005	*****	*****	0.003	*****
No. Weeks		5.000	*****	*****	*****	5.000	*****
 Total P	 9/2/2009	 0.164	 0.180	 0.090	 *****	 0.112	 0.042
	9/10/2009	0.154	0.060	*****	*****	0.047	*****
	9/17/2009	0.133	0.060	*****	*****	0.030	*****

11/5/2009

DMR Parameter calc-Sep09.xls

Total o-PO4

DMR Parameter Calcs

	002	2006
9/23/2009	0.152	0.070
9/30/2009	0.135	0.060
Total		0.450
No. Weeks		5.000

{Courtesy of OMEGA}

Parameter	Date	Flow	Raw Data (mg/L)	Avg Raw	Max Raw	Kg/D	Avg (Kg/D)	Max (Kg/D)
	9/2/2009	0.164	*****	*****	*****	*****	*****	*****
	9/10/2009	0.154	*****	*****	*****	*****	*****	*****
	9/17/2009	0.133	*****	*****	*****	*****	*****	*****
	9/23/2009	0.152	*****	*****	*****	*****	*****	*****
	9/30/2009	0.135	*****	*****	*****	*****	*****	*****
TSS	9/10/2009	0.154	4.600	3.950	4.600	2.681	2.77	2.881
	9/17/2009	0.133	3.300	*****	*****	1.661	*****	*****
BOD	9/10/2009	0.154	46.200	25.100	46.200	26.930	14.72	26.930
	9/17/2009	0.133	4.000	*****	*****	2.014	*****	*****
O&G	9/10/2009	0.154	0.001	0.001	0.001	0.001	0.001	0.001
	9/17/2009	0.133	0.001	*****	*****	0.001	*****	*****
Fecal Coliform	9/2/2009	*****	4.000	*****	*****	*****	*****	*****
	9/10/2009	*****	7.000	*****	*****	*****	*****	*****
	9/17/2009	*****	13.000	*****	*****	*****	*****	*****
	9/23/2009	*****	2.000	*****	*****	*****	*****	*****
	9/30/2009	*****	0.001	*****	*****	*****	*****	*****
Total	*****	*****	26.001	*****	*****	*****	*****	*****
No. Weeks	*****	*****	5.000	*****	*****	*****	*****	*****
Enterococci	9/2/2009	2420.000	*****	*****	*****	*****	*****	*****
	9/10/2009	8.600	*****	*****	*****	*****	*****	*****
	9/17/2009	16.000	*****	*****	*****	*****	*****	*****
	9/23/2009	92.000	*****	*****	*****	*****	*****	*****
	9/30/2009	210.000	*****	*****	*****	*****	*****	*****
Total	*****	2746.600	*****	*****	*****	*****	*****	*****
No. Weeks	*****	5.000	*****	*****	*****	*****	*****	*****
NH3	9/10/2009	15.600	14.100	15.600	*****	*****	*****	*****
	9/17/2009	12.600	*****	*****	*****	*****	*****	*****

COMMONWEALTH OF VIRGINIA - DEPARTMENT OF ENVIRONMENTAL QUALITY
GENERAL PERMIT FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS DISCHARGES AND NUTRIENT TRADING IN THE CHESAPEAKE BAY WATERSHED IN VIRGINIA
DISCHARGE MONITORING REPORT (DMR)

NAME Omega Protein - Reedville
 ADDRESS PO Box 175
 Reedville, VA 22537
 FACILITY LOCATION 610 Menard Rd
 PRO² PRO³
 OCT 1 3 2003 OCT 1 3 2003

VAN0200317
 PERMIT NUMBER

501
 OUTFALL NUMBER

Department of Environmental Quality
 Piedmont Regional Office
 4949-A Cox Road
 Glen Allen, Virginia 23060-6296
 804-527-5020

NOTE: READ PERMIT AND GENERAL INSTRUCTIONS
 BEFORE COMPLETING.

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION			NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
001 FLOW	REPORTED	3.065	*****	MGD	*****	*****	*****	0	Cont	Rec
	PERMIT REQUIREMENT	NL	*****		*****	*****	*****	CONT.	REC	
012 PHOSPHORUS, TOTAL (AS P)	REPORTED	*****	*****		*****	0.66	*****	0	1/w	24HC
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	8HC
013 NITROGEN, TOTAL AS N	REPORTED	*****	*****		*****	8.18	*****	0	1/w	24HC
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	8HC
068 TRN (N-KJEL)	REPORTED	*****	*****		*****	8.06	*****	0	1/w	24HC
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	8HC
389 NITRITE+NITRATE-N, TOTAL	REPORTED	*****	*****		*****	0.12	*****	0	1/w	24HC
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	8HC
791 NITROGEN, TOTAL AS N (MONTHLY LOAD)	REPORTED	*****	*****		*****	*****	*****	0	Month	Ca/C
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	CALC
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTED	4.390	*****	LB/MO	*****	*****	*****	0	Month	Ca/C
	PERMIT REQUIREMENT	NL	*****		*****	NL	*****	MGL	2M	CALC
795 ORTHOPHOSPHATE (AS P)	REPORTED	0.32	*****	*****	*****	0.29	*****	0	1/w	24HC
	PERMIT REQUIREMENT	*****	*****		*****	NL	*****	MGL	2M	8HC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS:

BYPASSES AND OVERFLOWS	Total Occurrences	Total Flow (MGD)	Total BOD (kg/d)	OPERATOR IN RESPONSIBLE CHARGE				DATE
				TYPED OR PRINTED NAME	SIGNATURE	PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	CERTIFICATE NO.	
	None	0	0	Theodore Schultz		1911004868P	09/10/08	

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate data relevant to a specific function. I am aware that any person or persons who misuse this system, or those persons directly responsible for gathering the information, may be subject to significant penalties for such misuse, including the possibility of fine and imprisonment. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. SEE 18 U.S.C. & (10) AND 33 U.S.C. & 1319. PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND/OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS.

Express flow to
nearest 0.01 lb/d

Round lb/day
to nearest whole #

OF 501	Sep-09 Omega	VAN020037
DEQ check by M. Dare	TP mg/l	TP lb
flow		
1	3.86	1.36
2	3.10	
3	3.63	
4	3.99	
5	1.86	
6		
7		
8	2.04	
9	2.13	0.35
10	3.90	
11		
12		
13		
14	4.25	
15	4.08	0.56
16	3.90	
17	4.25	
18	4.25	
19	0.58	
20		
21	1.77	
22	4.08	0.28
23	3.46	
24	3.81	
25	2.93	
26	2.30	
27	2.66	
28	1.15	
29	3.55	
30	2.04	
AV		
MAX		
lb/mo		

Express concentration
to nearest 0.01 mg/l

ROUND LB/DAY
TO NEAREST WHOLE #

O/F 501		Sep-09 Omega		VAN020037	
DEQ check by M. Dare		flow	TKN	NO2/NO3 mg/l	TN lb
1	3.86	14.8	0.05	14.85	8.3438 478
2	3.10				
3	3.63				
4	3.99				
5	1.86				
6					
7	2.04				
8	2.13	2.4	0.32	2.72	8.3438 48
9	3.90				
10					
11					
12					
13					
14	4.25				
15	4.08	8.4	0.05	8.45	8.3438 287
16	3.90				
17	4.25				
18	4.25				
19	0.58				
20					
21	1.77				
22	4.08		3	0.3	8.3438 112
23	3.46				
24	3.81				
25	2.93				
26	2.30				
27	2.66				
28	1.15				
29	3.55				
30	2.04	11.7	0.05	11.75	8.3438 200
	3.07	8.06	0.15	8.21	225
	4.25				x24 5400
AV					
MAX					
lb/mo					

Express Flow to
NEAREST 0.01 MO

Bound up/day
to nearest whole #

Explicit Concentration
to nearest 0.01 mg/l

**GENERAL PERMIT FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS DISCHARGES AND NUTRIENT TRADING IN THE CHESAPEAKE BAY WATERSHED IN VIRGINIA
DISCHARGE MONITORING REPORT (DMR)**

NAME Omega Protein - Reedville
ADDRESS PO Box 175
Reedville, VA 22539

FACILITY LOCATION 610 Menhaden Rd

RECEIVED
OCT 13 2003
PBO

		MONITORING PERIOD			
YEAR	MO	DAY	YEAR	MO	DAY
09	09	01	09	09	30

PARAMETER		QUALITY OR CONCENTRATION						NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
001 FLOW	REPORTED	0.161	*****	MGD	*****	*****	*****	0	Cont	Rec
PERMIT REQUIREMENT		NL	*****		*****	*****	*****		CONT.	REC
012 PHOSPHORUS, TOTAL (AS P)	REPORTED	*****	*****		*****	0.09	*****	0	1/w	24HC
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		2M	8 HC
013 NITROGEN, TOTAL AS N	REPORTED	*****	*****		*****	21.5	*****	0	1/w	24HC
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		2M	8 HC
068 TKN (N-Kjeld)	REPORTED	*****	*****		*****	21.1	*****	0	1/w	24HC
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		2M	8 HC
189 NITRITE+NITRATE-N, TOTAL	REPORTED	*****	*****		*****	0.4	*****	0	1/w	24HC
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		2M	8 HC
791 NITROGEN, TOTAL AS N (MONTHLY LOAD)	REPORTED	*****	6906	LBM/O	*****	*****	*****	0	Month	Cal/C
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		MONTH	CAC
793 PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD)	REPORTED	*****	297	LBM/O	*****	*****	*****	0	Month	Cal/C
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		MONTH	CAC
795 ORTHOPHOSPHATE (AS P)	REPORTED	*****	3	*****	*****	3	*****	0	1/w	24HC
PERMIT REQUIREMENT		*****	*****	NL	*****	*****	*****		2M	8 HC

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS:

BYPASSES AND OVERFLOWS	Total Occurrences	Total Flow (MGD)	Total BOD (mg/d)	OPERATOR IN RESPONSIBLE CHARGE	DATE
Vane	0	0	0	Theodore Schultz	191100 4868
				SIGNATURE	CERTIFICATE NO.
				William E. Murphy	09 10 08

I certify under penalty of perjury that this document and all attachments were presented under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. SEE 18 U.S.C. & 1001 AND 33, 31, & 3151. PENALTIES UNDER THESE STATUTES MAY INCLUDE FINES UP TO \$10,000 AND/OR MAXIMUM IMPRISONMENT OF BETWEEN 6 MONTHS AND 5 YEARS.

TYPED OR PRINTED NAME	PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	DATE
Attn: Code Number	Attn: Code Number	09 10 08

Do NOT USE & QL

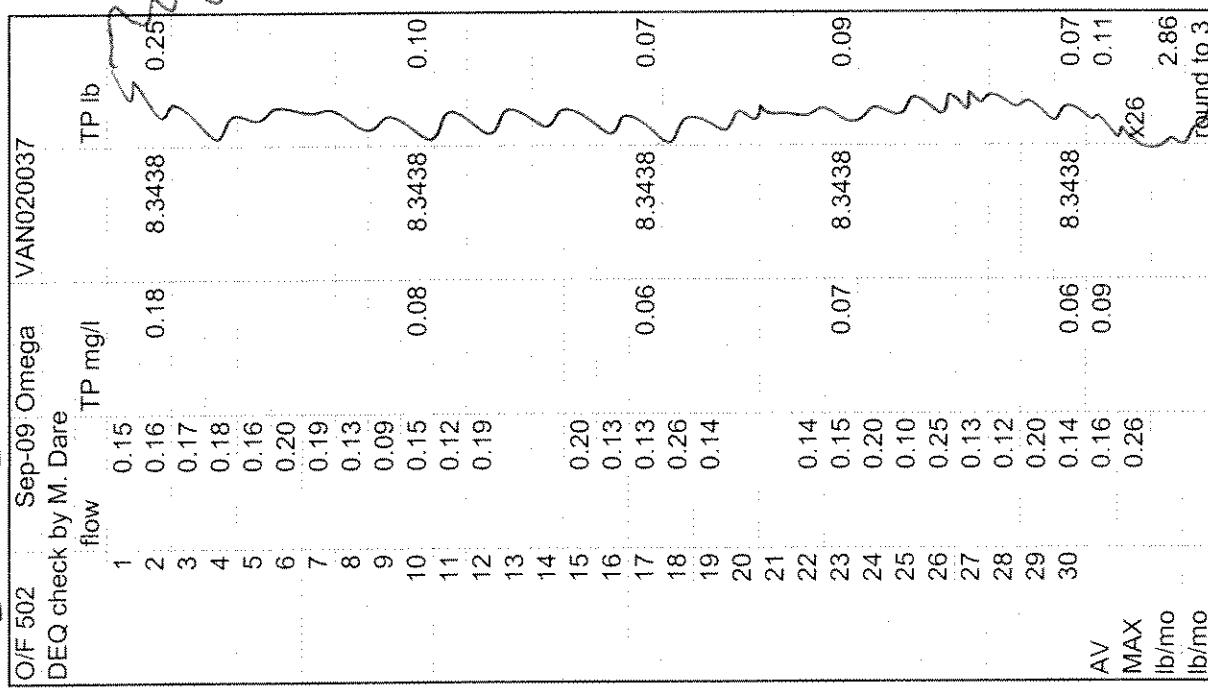
Express Flow
to NEAREST HEAD

*Round 13/14
To NEAREST WHOLE #*

O/F 502	Sep-09	Omega	VAN020037	
DEQ check by M. Dare	flow	TKN	NO2/NO3 TN mg/l	TN lb
1	0.15	24.6	0.05	24.65 8.3438 34
2	0.16			
3	0.17			
4	0.18			
5	0.16			
6	0.20			
7	0.19			
8	0.13			
9	0.09			
10	0.15	17.8	0.32	18.12 8.3438 23
11	0.12			
12	0.19			
13				
14				
15	0.20			
16	0.13			
17	0.13	14.7	0.54	15.24 8.3438 17
18	0.26			
19	0.14			
20				
21	0.14			
22	0.15	22.9	0.45	23.35 8.3438 30
23	0.20			
24	0.10			
25	0.25			
26	0.13			
27	0.12			
28	0.20			
29	0.14	25.4	1	26.4 8.3438 30
30	0.16	21.08	0.47	21.55 x26 27
AV MAX	lb/mo			702

*Express Concentration
To NEAREST 0.01 mg/l*

EXPRESS Flow
To Nearest 0.01 MGD



WHERE DAILY LOADS
WOULD ROUND TO ZERO,
IT IS RECOMMENDED THAT
DAILY LOADS ARE LEFT
AS IS AND THESE ROUNDED
FOR MONTHLY LOAD.

EXPRESS Concentration
to nearest 0.01 mg/l

EXCERPT FROM
NUTRIENT GENERAL
PERMIT

9 VAC 25-820-70
 Page 5 of 14

E. Monitoring requirements.

1. Discharges shall be monitored by the permittee, during weekdays, as specified below:

STP design flow	>20.000 MGD	1.000- 19.999 MGD	0.040-0.999 MGD
Effluent TN load limit for industrial facilities		>100000 lb/yr	487-99999 lb/yr
Effluent TP load limit for industrial facilities		>10000 lb/yr	37-9999 lb/yr
Parameter	Sample Type and Collection Frequency		
Flow	Totalizing, Indicating and Recording		
Nitrogen Compounds (Total Nitrogen = TKN + NO₂⁻ (as N) + NO₃⁻ (as N))	24 HC 3 Days/Week	24 HC 1/Week	8 HC 2/Month, > 7 days apart
Phosphorus Compounds (Total Phosphorus and Orthophosphate)	24 HC 3 Days/Week	24 HC 1/Week	8 HC 2/Month, > 7 days apart

2. Monitoring for compliance with effluent limitations shall be performed in a manner identical to that used to determine compliance with effluent limitations established in the individual VPDES permit, and monitoring or sampling shall be conducted according to analytical laboratory methods approved under 40 CFR Part 136 (2006), unless other test or sample collection procedures have been requested by the permittee and approved by the Department in writing. Monitoring may be performed by the permittee at frequencies more stringent than listed above; however, the permittee shall report all results of such monitoring.

3. Loading values reported in accordance with Part I, Paragraphs E and F of this general permit shall be calculated and reported to the nearest pound without regard to mathematical rules of precision.

4. Data shall be reported on a form provided by the Department, by the same date each month as is required by the facility's individual permit. The total monthly load shall be calculated in accordance with the following formula;

$$ML = ML_{avg} * d$$

where:

ML = total monthly load (lb/mo)

ML_{avg} = monthly average load as reported on DMR (lb/d)

d = number of discharge days in the calendar month

$$ML_{avg} = \frac{\sum DL}{s}$$

where:

DL = daily load, = daily concentration (expressed as mg/l to the nearest 0.01 mg/l) multiplied by the flow volume of effluent discharged during the 24-hour period (expressed as MGD to the nearest 0.01 MGD), multiplied by 8.3438 and rounded to the nearest whole number to convert to pounds per day (lbs/day)

s = number of days in the calendar month in which a sample was collected and analyzed

All daily concentration data below the quantification level (QL) for the analytical method used should be treated as half the QL. All daily concentration data equal to or above the QL for the analytical method used shall be treated as it is reported.

The total year-to-date mass load shall be calculated in accordance with the following formula:

$$AL-YTD = \sum_{(Jan-current month)} ML$$

where:

AL-YTD = calendar year-to-date annual load (lb/yr)

ML = total monthly load (lb/mo) as reported on DMR

Dare,Michael

From: Spicer,Jason
Sent: Tuesday, September 01, 2009 11:39 AM
To: Dare,Michael
Cc: Stell,Steven; Brockenbrough,Allan; Staples,Wayne; Cunningham,Frederick
Subject: RE:

Michael,

When rounding daily or monthly loads for the NGP permit, permittees should not use zero. It is recommended that daily loads are left as is and then rounded for monthly load.

Jason T. Spicer

Operator Training Program
Office of Water Permits and Compliance Assistance
Virginia Department of Environmental Quality

P.O. Box 1105
Richmond, VA 23218

Phone: (804) 698-4143
Fax: (804) 698-4032
Email: jason.spicer@deq.virginia.gov
Web: www.deq.virginia.gov/tptp/

To receive wastewater operator training program announcements by email, sign up at <http://www.deq.virginia.gov/lists/www.deq.virginia.gov/lists/>.

Please note: Virginia's Freedom of Information Act (FOIA) requires that public documents be available for review upon request. This e-mail communication, your reply, and future e-mails may therefore be subject to public disclosure.

Attachment 7 – Effluent Limitation Development – Outfall 002

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Water Regional Office*

4949-A Cox Road, Glen Allen, VA 23060-6296

804/527-5020

SUBJECT: Cockrell's Creek Wasteload Allocations and Dilution Analysis
Zapata Protein (USA), Inc. Discharge (VA0003867)

TO: Denise Mosca
FROM: Jon van'Soestbergen *[Signature]*
DATE: September 17, 1998
COPIES: Dale Phillips, Curt Linderman

Per your request, I have reviewed the BOD wasteload allocations for the subject discharge to Cockrell's Creek. I also constructed a CORMIX model to analyze dilution ratios at the discharge associated with different diffuser designs. Two discharges (Ampro Fisheries and Zapata Protein) previously competed for the available assimilative capacity of the receiving stream, and previous models and analyses simulated both discharges to allocate wasteloads. However, the Ampro discharge was terminated. The purpose of this review was to determine if the BOD wasteload previously allocated to Ampro was available in part, or in total, to Zapata. The CORMIX analysis of a diffuser for outfall number 002 was performed to determine the dilution ratio for establishing wasteload allocations for conservative parameters.

BOD Wasteload Allocation Review

In September 1976, the Virginia Institute of Marine Sciences (VIMS) completed a mathematical water quality study of the Great Wicomico River and Cockrell's Creek. The model determined that an average of 5,000 lbs/day of BOD₅ would maintain water quality standards in the upper layer of the creek, which was the only layer used to determine the pollutant loading to the creek. Of this total, 4,900 lbs/day would be allocated to Ampro (then known as Standard Products) and Zapata.

My review of the available information leads me to conclude that the total allowable loading to Cockrell's Creek is 5,000 lbs/day of BOD₅, regardless of the point of discharge. Therefore, with the termination of the Ampro discharge, the entire 4,900 lbs/day previously allocated to the two discharges is available for allocation to Zapata.

CORMIX Diffuser Analysis

Zapata currently proposes to discharge through a total of four outfalls to Cockrell's Creek, but only outfall 002 was considered for a diffuser. The proposed discharge flow from this outfall is 0.300 mgd. The complex design of the diffuser included with the permit fact sheet can not be accurately analyzed using the CORMIX model. However, by simplifying the design somewhat, the expected dilution the diffuser will provide could be estimated. In addition to analyzing the design of this diffuser, a modified design was analyzed which affords better dilution in the near field.

Two diffuser designs were analyzed; one which closely approximates the design included in the fact sheet ("short diffuser") and one which affords better dilution ("long diffuser"). For each case, dilution was analyzed relative to one-hour averages under critical conditions, which most closely approximates the way the acute standards are written.

Cockrell's Creek Wasteload Allocations and Dilution Analysis
Page 2

"Short Diffuser" - This diffuser design consists of a 12-inch diameter pipe extending 35 feet perpendicular to the east bank of the creek into water of approximately 5 foot depth. The diffuser line (the part with holes) starts 15 feet from the shore and extends to the end of the diffuser (20 feet). There are 13 holes of 4 inch diameter in the top of the pipe, and the end is blocked such that all flow is directed upward through the diffuser ports (holes). A rough sketch of the diffuser is attached.

This "short diffuser" design results in a dilution of 50:1 at the boundary of the mixing zone. This dilution ratio should be used to determine both acute and chronic WLAs for the discharge. The associated mixing zone boundary is 7.62 meters (25 feet) measured in a circle from the diffuser midpoint.

"Long Diffuser" - This diffuser consists of a 12-inch diameter pipe extending 60 feet perpendicular to the east bank of the creek, also into water of approximately 5 foot depth. The diffuser line starts 20 feet from shore and extends to the end of the diffuser (40 feet). There are 8 holes of 4 inch diameter, located such that flow will be directed in a 45 degree angle toward the water surface in the downstream direction during ebb tide. Again, the end of the pipe is closed so that all flow discharges through the diffuser ports. A rough sketch of the diffuser is attached.

This "long diffuser" design results in a dilution of 100:1 at the boundary of the mixing zone. This dilution should be used for both the acute and chronic WLAs for the discharge. The associated mixing zone boundary is 6.10 meters (20 feet) measured in a circle from the diffuser midpoint.

Conclusions and Recommendation

The BOD₅ wasteload available to Zapata Protein is 4,900 lbs/day.

If the "short diffuser" is specified, a dilution ratio of 50:1 should be used. For the "long diffuser", the dilution ratio can be increased to 100:1. This shows that different diffuser designs can result in dramatically different dilution ratios, and thus need to be taken into consideration when establishing wasteload allocations and permit limits. As such, it is important that the diffuser design be specified for a wasteload allocation based on a given dilution ratio. It is recommended that the alternate diffuser designs be presented to the permittee so that the advantages of each design can be considered. The designs presented should serve only as preliminary designs. The sketches provided herewith should in no way be construed as final diffuser designs. Alternate designs not yet considered are also possible, and can be submitted by the permittee for subsequent analysis using CORMIX.

Pertinent documentation for the CORMIX analysis is included herewith. Should you have any questions or need additional information, please do not hesitate to contact me.

Attachment:

Notes and Model Runs - Zapata Cormix Diffuser Analysis - Cockrell's Creek, 09/16/1998, 24 pages

Maynard D. Phillips@WPS@DEQ
Denise M. Mosca@KLMCK@DEQ
Curtis J. Linderman@RCHMD@DEQ

To: Jon VanSoestbergen@RCHMD@DEQ
Subject: Zapata CORMIX analysis
Date: Thursday, September 17, 1998 9:34:00 EDT
To: N
Cc:
Bcc:
Re: Reward by:

Re:

I am sending you the results of the CORMIX analysis I did for Zapata today. I have not yet sent the information to Denise pending your review. Please let me know if you have any concerns with the analysis. I will wait to send the package to Denise until I hear from you one way or the other.

In summary, I ended up analyzing two different diffuser designs. The first approximates the design that was included in the package provided by Denise, and the second is a design of my own. The first ("short diffuser") results in a dilution ratio of 50:1. The second ("long diffuser") results in a dilution ratio of 100:1. The mixing zone for the first is 25 feet, for the second, 20 feet. The ratio used by the permit writer will depend on the final diffuser design selected by the permittee.

As we discussed yesterday, I analyzed each design 1 hr before slack tide, at slack tide, and 1 hr after slack tide. Then I averaged the most conservative results for each diffuser to obtain the final dilution ratio. This results in a dilution ratio based on a 1-hr average flow under critical conditions, which best reflects the way the acute standard is written. My recommendation is that the selected dilution ratio be used for both acute and chronic WLA determination.

Thanks for your help on this.

N.

Uruguay and one
Attachment 9

Jon VanSoestvergen@RCHMD@DEQ

Maynard D. Phillips@WPS@DEQ

Monday September 28, 1998 8:45:07 EDT

N
Jon VanSoestbergen@RCHMD@DEQ

cc: Maynard D. Phillips@WPS@DEQ
rwarded date: Monday, September 28, 1998 10:23:12 EDT
nments by: Jon VanSoestbergen@RCHMD@DEQ
nments:

nise:

llowing are Dale's comments regarding my 9/17/1998 memo and work on the
pata wasteload allocation review and CORMIX analysis. If you include this
mail as part of the file I don't see any reason to rewrite my 9/17/1998
no. Could you please make a copy of the 9/17/1998 memo and attachment (24
ges) and send it to me. I forgot to make a copy before I gave you the
akage when you were here last week.

address Dale's comments/questions:

le's explanation as to why the long diffuser is better should be adequate documentation regarding this issue.

e circular mixing zone I describe in my 9/17/1998 is as measured from the midpoint of the diffuser. CORMIX defines the origin of the coordinate (x-y-plane) as this point. S (the hydrodynamic centerline dilution) is then assured from this origin. Therefore, I believe my definition of the mixing zone as a circle measured around the diffuser midpoint is not incorrect. However, describing the mixing zone as extending from the diffuser in any direction is also acceptable, and would have the effect only of extending the boundary slightly further out in the y-direction toward the middle of the stream, in theory resulting in a slightly larger mixing zone. Practically, though, the difference between the two is of the order of 10 feet in the y-direction, which in the context of water quality monitoring and model accuracy is negligible. In any event, the final defined mixing zone will be function of the final diffuser design submitted by Zapata. You should provide this final design to me for analysis when it is received, unless some sort of mixing zone analysis is provided as documentation with the design.

will consider this e-mail as finalizing my 9/17/1998 memorandum and my work
on this project. If you have any questions or need additional information,
please don't hesitate to call me.

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ZAPATA CORBIN 'DIFFUSER ANALYSIS - COCKRELL'S CREEK

9-16-98

VA DEQ - PRD J. VAN SOESTBERGEN

MODEL RUN SUMMARIES

6 SEPARATE SCENARIOS WERE RUN TO OBTAIN AVERAGE DILUTION RATIOS RELATIVE TO THE ACUTE STANDARD FOR TWO DIFFERENT DIFFUSER DESIGNS. THREE SCENARIOS WERE NECESSARY FOR EACH DESIGN; AFTER-SLACK (FLOW UP THE CREEK), SLACK (NO AMBIENT FLOW), AND BEFORE-SLACK (FLOW DOWN THE CREEK).

TWO DIFFUSER DESIGNS WERE SIMULATED; SHORT DIFFUSER AND LONG DIFFUSER. SHORT DIFFUSER MOST CLOSELY REPRESENTS THE PROPOSED DIFFUSER DESIGN SUBMITTED BY THE PERMITTEE. LONG DIFFUSER IS A PRO-DESIGNED ALTERNATIVE THAT RESULTS IN BETTER DILUTION IN THE NEAR-FIELD UNDER EBB OR FLOW-TIDE CONDITIONS.

THE FILES ARE AS FOLLOWS

ZAPATA 1 : AFTER-SLACK ; SHORT DIFFUSER

ZAPATA 2 : SLACK TIDE

ZAPATA 3 : BEFORE-SLACK

ZAPATA 4 : AFTER-SLACK ; LONG DIFFUSER

ZAPATA 5 : SLACK TIDE

ZAPATA 6 : BEFORE SLACK.

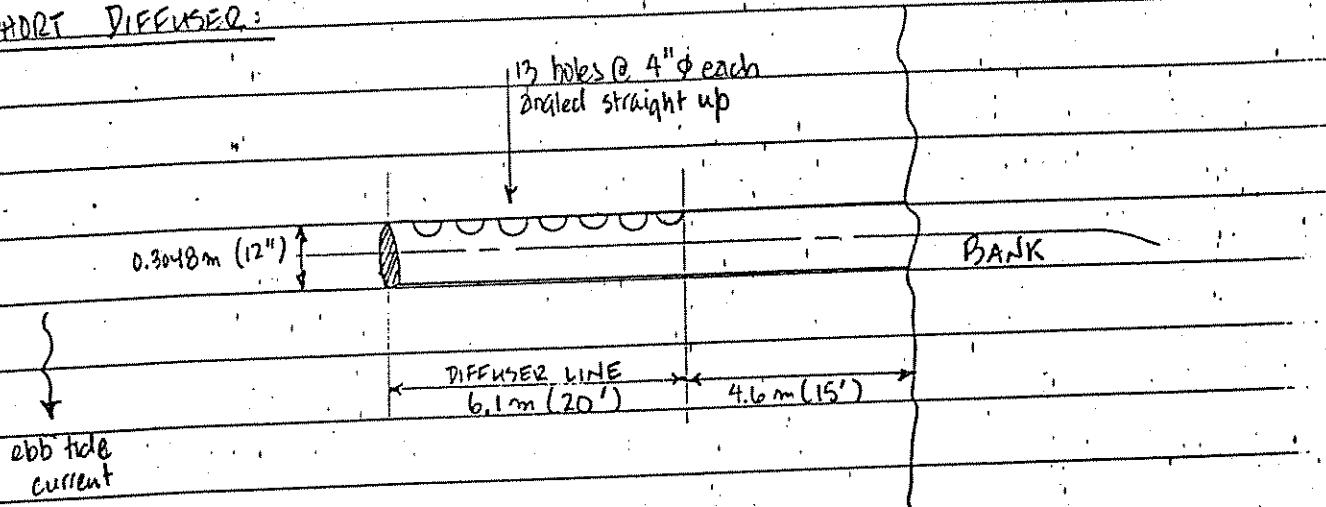
ALL SCENARIOS WERE RUN USING CORMIX2 ; I.E. A MULTIPORT SUBMERGED DIFFUSER.

DESIGN SKETCHES OF THE TWO DIFFUSERS ARE ATTACHED.

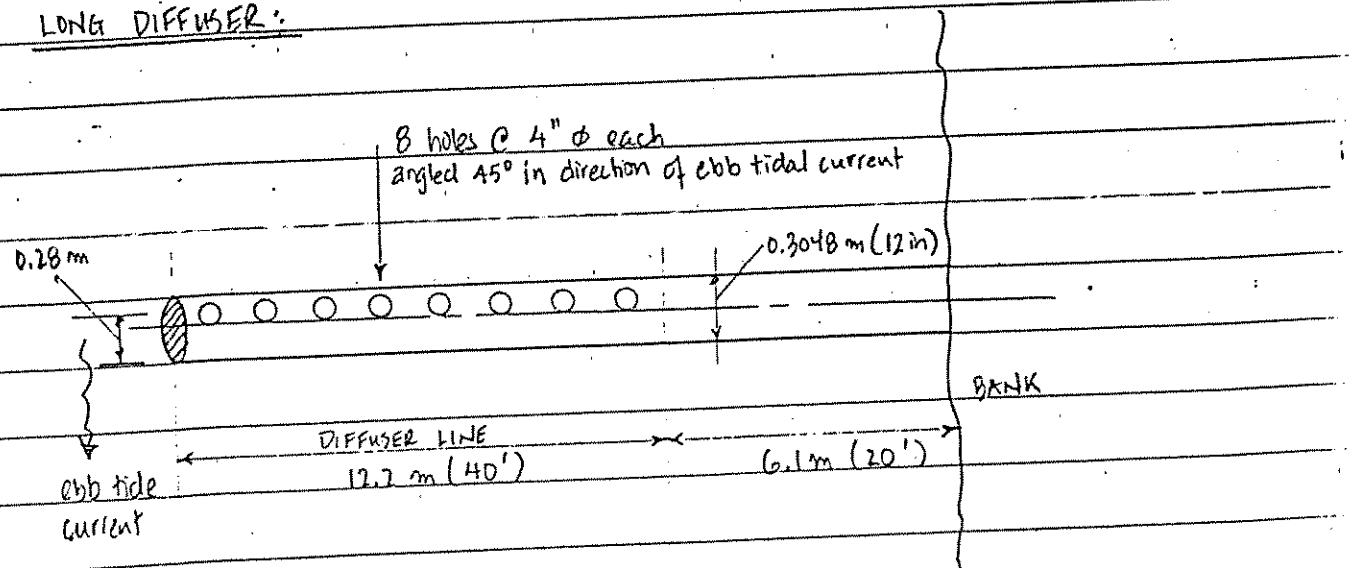
ZAPATA CORNIX "DIFFUSER ANALYSIS - COCKREWS CREEK"

9.16.98

SHORT DIFFUSER:



LONG DIFFUSER:



ZARATA CORNIX DIFFUSER ANALYSIS

9-16-98

AMBIENT DATA

CHANNEL TYPE :	BOUNDED
WIDTH OF CHANNEL:	503 m
CHANNEL APPEARANCE:	FAIRLY STRAIGHT & UNIFORM
AVERAGE DEPTH:	1.524 m
ACTUAL DEPTH @ DISCH:	1.524 m
AMBIENT FLOW FIELD:	TIDAL REVERSING
PERIOD OF REVERSAL:	12.4 hr SEMI-DIURNAL
FLOW CONDITION :	① AFTER SLACK ; ② SLACK ; ③ BEFORE SLACK
TIME :	1.0 HR
INSTANTANEOUS AMBIENT VEL:	0.15 m/s
MAXIMUM AMBIENT VELOCITY:	0.30 m/s
MANNING'S "n" :	0.07
DENSITY CONDITIONS:	UNIFORM
FRESH OR NON-FRESH:	NON FRESH
AMBIENT DENSITY:	999.7 kg/m ³
WIND SPEED:	2 m/s

ZAPATA CORNIX DIFFUSER ANALYSIS

9-16-98

DISCHARGE DATA

	SHORT	LONG
LENGTH OF DIFFUSER LINE:	6.1 m	12.2 m
BANK DIRECTION:	LEFT	LEFT
DISTANCE TO FIRST NOZZLE:	4.6 m	6.1 m
DISTANCE TO LAST NOZZLE:	10.7 m	18.3 m
ALIGNMENT ANGLE:	90	90
NUMBER OF OPENINGS:	13	8
SINGLE PORTS:	YES (A)	YES (A)
DIAMETER OF PORTS:	0.1 m	0.1 m
CONTRACTION COEFFICIENT:	1.0	1.0
HEIGHT OF PORT CENTERS:	0.3048 m	0.28 m
UNIDIRECTIONAL OR ALTERNATING:	ALTERNATING (B)	UNIDIRECTIONAL (A)
AVERAGE VERTICAL ANGLE:	—	90 45
RELATIVE ORIENTATION ANGLE:	—	90
SAME DIRECTION OR FANNED OUT:	SAME (A)	SAME (A)
HORIZONTAL ANGLE OF DISCHARGE:	—	0
DIFFUSER FLOW RATE:	0.0131 m/s	0.0131 m/s
FRESHWATER EFFLUENT:	YES	YES
TEMPERATURE:	27.7 °C	27.7 °C
HEATED DISCHARGE:	No	No
UNITS:	PPB	PPB
CONCENTRATION:	1000	1000
CONSERVATIVE SUBSTANCE:	YES	YES

ZAPATA CORNIX DIFFUSER ANALYSIS

9-16-98

MIXING ZONE SPECIFICATION

EFFLUENT TOXIC BY USEPA STANDARDS: NO

AMBIENT WATER QUALITY STANDARD: NO

RMZ SPECIFICATION: NO

MAX DISTANCE OF REGION OF INTEREST: 6,000 m

NUMBER OF OUTPUT DISPLAY STEPS: 10

ZAPATA CORN N DIFFUSER ANALYSIS

9-16-98

SUMMARY OF RESULTS① SHORT DIFFUSER

FILE	AMBIENT SCENARIO	\$
ZAPATA1	AFTER-SLACK	97.3
ZAPATA2	SLACK	5.8
ZAPATA3	BEFORE-SLACK	105.6

$$\text{CONSERVATIVE AVERAGE} = (97.3 + 5.8) / 2 = 51.6 \quad \text{SAY } 50:1$$

② LONG DIFFUSER

ZAPATA4	AFTER-SLACK	197.9
ZAPATA5	SLACK	5.1
ZAPATA6	BEFORE-SLACK	210.8

$$\text{CONSERVATIVE AVERAGE} = (197.9 + 5.1) / 2 = 101.5 \quad \text{SAY } 100:1$$

Attachment 9
24

>system CORMIX2:
ibmerged Multiport Diffuser Discharges CORMIX v.3.20 September 1996

SE DESCRIPTION ZAPATA^VA0003867
ite name/label:
esign case:
ILE NAME: AFTER^SLACK^SHORT^DIFFUSER
ime of Fortran run: cormix\sim\ZAPATA1 .cx2
09/16/98--16:06:30

ENVIRONMENT PARAMETERS (metric units)

VIRONMENI PARAMETER
 bounded section
 IS = 503.00 AS = 766.57 QA = 114.99 ICHREG= 1
 IA = 1.52 HD = 1.52
 Tidal Simulation at TIME = 1.000 h
 PERIOD= 12.40 h UAMAX = .300 dUa/dt=.150 (m/s)/h
 JA = .150 F = .334 USTAR = .3065E-01
 JW = -2.000 UWSTAR=.2198E-02
 Uniform density environment
 STRCND= U RHOAM = 999.7000

WATER DISCHARGE PARAMETERS (metric units)

IFFUSER DISCHARGE PARAMETERS (in)
 Diffuser type: DITYPE= alternating perpendicular
 BANK = LEFT DISTB = 7.65 YB1 = 4.60 YB2 = 10.70
 LD = 6.10 NOPEN = 13 SPAC = .51
 DO = .100 A0 = .008 H0 = .30
 Nozzle/port arrangement: alternating without fanning
 GAMMA = 90.00 THETA = 90.00 SIGMA = .00 BETA = 90.00
 U0 = .128 Q0 = .013 = .1310E-01
 RHO0 = 996.3187 DRHO0 = .3381E+01 GPO = .3317E-01
 C0 = .1000E+04 CUNITS= PPB
 IPOLL = 1 KS = .0000E+00 KD = .0000E+00

?FLUX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 $q_0 = .2148E-02$ $m_0 = .2755E-03$ $j_0 = .7123E-04$ SIGNJ0= 1.0
 Associated 2-d length scales (meters)
 $lQ=B = .017$ $lM = .16$ $lm = .01$
 $lmp = 99999.00$ $lbp = 99999.00$ $la = 99999.00$

FLUX VARIABLES - ENTIRE DIFFUSER (metric units)
 $Q_0 = .1310E-01$ $M_0 = .1681E-02$ $J_0 = .4345E-03$
 Associated 3-d length scales (meters)
 $L_Q = .32$ $L_M = .40$ $L_m = .27$ $L_b = .13$
 $L_{Mp} = 99999.00$ $L_{bp} = 99999.00$ $L_{min} = .137$
 Tidal: $T_u = .0797$ $h_{Lu} = 3.432$

NON-DIMENSIONAL PARAMETERS .85
 $FR_0 = 5.44 \quad FRD_0 = 2.22 \quad R =$
 $(slot) \qquad \qquad \qquad (port/nozzle)$

FLOW CLASSIFICATION

MIXING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

= .1000E+04 CUNITS= PPB
 COX = 0
 STD = 0
 EGMZ = 0
 INT = 6000.00 XMAX = 6000.00

Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

7.65 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

TEP = 10 display intervals per module

GIN MOD201: DIFFUSER DISCHARGE MODULE

re to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.01	3.05

D OF MOD201: DIFFUSER DISCHARGE MODULE

GIN MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

because of the strong ambient current the diffuser plume of this crossflowing discharge gets RAPIDLY DEFLECTED.

near-field zone is formed that is VERTICALLY FULLY MIXED over the entire layer depth. Full mixing is achieved at a downstream distance of about five (5) layer depths.

profile definitions:

BV = layer depth (vertically mixed)

BH = top-hat half-width, measured horizontally in y-direction

S = hydrodynamic average (bulk) dilution

C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.01	3.05
.76	.00	.35	34.2	.292E+02	.16	3.05
1.52	.00	.40	47.5	.210E+02	.32	3.06
2.29	.00	.44	57.4	.174E+02	.47	3.06
3.05	.00	.49	65.4	.153E+02	.62	3.06
3.81	.00	.53	72.3	.138E+02	.77	3.06
4.57	.00	.58	78.3	.128E+02	.92	3.07
5.33	.00	.62	83.7	.119E+02	1.07	3.07
6.10	.00	.67	88.6	.113E+02	1.22	3.07
6.86	.00	.72	93.1	.107E+02	1.37	3.08
7.62	.00	.76	97.3	.103E+02	1.52	3.08

umulative travel time = 101. sec

D OF MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

End of NEAR-FIELD REGION (NFR) **

IN MOD241: BUOYANT AMBIENT SPREADING

scharge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

OF MOD241: BUOYANT AMBIENT SPREADING

JIN, MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

sofile definitions:

BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed

BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
 measured horizontally in Y-direction

ZU = upper plume boundary (Z-coordinate)

ZL = lower plume boundary (Z-coordinate)

S_d = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

lume Stage 1 (not bank attached):

Time	Stage	T	Acc	Batt Acc	Z	S	C	BV	BH	ZU	ZL
		X	Y	Z							
8.38		.00	1.52	96.4	.104E+02	1.52	3.08	1.52	.00		
28.42		.00	1.52	101.1	.989E+01	1.52	3.79	1.52	.00		
48.47		.00	1.52	107.7	.929E+01	1.52	4.39	1.52	.00		
68.51		.00	1.52	115.9	.863E+01	1.52	4.92	1.52	.00		
88.55		.00	1.52	125.6	.796E+01	1.52	5.39	1.52	.00		
108.59		.00	1.52	136.4	.733E+01	1.52	5.83	1.52	.00		
128.64		.00	1.52	148.3	.674E+01	1.52	6.24	1.52	.00		
148.68		.00	1.52	161.1	.621E+01	1.52	6.62	1.52	.00		
168.72		.00	1.52	174.5	.573E+01	1.52	6.98	1.52	.00		
188.76		.00	1.52	188.5	.531E+01	1.52	7.32	1.52	.00		
208.80		.00	1.52	202.8	.493E+01	1.52	7.65	1.52	.00		

qualitative travel time = 1437. sec

Jume Stage 2 (bank attached):

Volume Stage 2 (Bank attached).									ZL
X	Y	Z	S	C	BV	BH	ZU		ZL
208.80	7.65	1.52	202.9	.493E+01	1.52	15.30	1.52		.00
220.00	7.65	1.52	217.1	.472E+01	1.52	15.73	1.52		.00

Cumulative travel time = 1845. sec

)RMIX prediction has been TERMINATED at last prediction interval.
Limiting time due to TIDAL REVERSAL has been reached.

3. OF MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

MIX2: Submerged Multiport Diffuser Discharges End of Prediction File

= .1000E+04 CUNITS= PPB
 X = 0
 D = 0
 MZ = 0
 IT = 6000.00 XMAX = 6000.00

Z COORDINATE SYSTEM:
 ORIGIN is located at the bottom and the diffuser mid-point:

7.65 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.
 EP, = 10 display intervals per module

IN MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

Initial conditions for individual jet/plume:

Average spacing between jet/plumes: .51 m

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.05	.05

OF MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

IN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

Jet/plume transition motion in weak crossflow.

Time of flow establishment:	XE	YE	THETAE	90.00	SIGMAE	.00
	.00	.00	=	=	.00	ZE = .30

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = before merging: Gaussian 1/e (37%) half-width in horizontal plane
 normal to trajectory

after merging: top-hat half-width in horizontal plane
 parallel to diffuser line

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	SV	BH
Individual jet/plumes before merging:						
.00	.00	.30	1.0	.100E+04	.05	.05
.00	.00	.41	1.1	.877E+03	.06	.06
.00	.00	.52	1.5	.669E+03	.07	.07
.00	.00	.62	1.9	.526E+03	.08	.08
.00	.00	.73	2.3	.426E+03	.09	.09
.00	.00	.84	2.8	.353E+03	.10	.10
.00	.00	.94	3.4	.298E+03	.11	.11
.00	.00	1.05	3.9	.255E+03	.12	.12
.00	.00	1.16	4.5	.222E+03	.13	.13
.00	.00	1.27	5.1	.195E+03	.14	.14
.00	.00	1.37	5.8	.173E+03	.15	.15

Cumulative travel time = 7. sec
 Merging of individual jet/plumes not found in this module, but interaction
 will occur in following module. Overall jet/plume interaction dimensions:

.00	.00	1.37	5.8	.173E+03	.15	3.10
-----	-----	------	-----	----------	-----	------

D OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

N MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

Vertical angle of layer/boundary impingement* = 90.00 deg
Horizontal angle of layer/boundary impingement* = .00 deg

discharge into STAGNANT AMBIENT environment:

charge into STAGNANT AMBIENT environment.
STEADY-STATE MIXING CONDITION IS NOT POSSIBLE in this zone,
SOLVENT DILUTION MAY OCCUR!

even though some ADDITIONAL DILUTION MAY OCCUR!

even though some ADDITIONAL DILUTION MAY OCCUR, all four field processes will be UNSTEADY.

Also, all far-field processes will be UNSTEADY.
SIMULATION STOPS because of stagnant ambient conditions.

OF MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

End of NEAR-FIELD REGION (NFR) **

VILATION STOPS because of STAGNANT AMBIENT conditions.

MULATION STOPS because of STAGNANT AIR.
All far-field processes will be UNSTEADY.

= .1000E+04 CUNITS= PPB
 X = 0
 D = 0
 MZ = 0
 T = 6000.00 XMAX = 6000.00

Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

7.65 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.
 SP = 10 display intervals per module

IN MOD201: DIFFUSER DISCHARGE MODULE

to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
 BH = top-hat half-width, in horizontal plane normal to trajectory
 S = hydrodynamic centerline dilution
 C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.01	3.05

OF MOD201: DIFFUSER DISCHARGE MODULE

IN MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

cause of the strong ambient current the diffuser plume of this crossflowing discharge gets RAPIDLY DEFLECTED. The near-field zone is formed that is VERTICALLY FULLY MIXED over the entire layer depth. Full mixing is achieved at a downstream distance of about five (5) layer depths.

Profile definitions:

BV = layer depth (vertically mixed)

BH = top-hat half-width, measured horizontally in y-direction

S = hydrodynamic average (bulk) dilution

C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.30	1.0	.100E+04	.01	3.05
.76	.00	.35	34.6	.289E+02	.16	3.05
1.52	.00	.40	48.4	.207E+02	.32	3.06
2.29	.00	.44	58.9	.170E+02	.47	3.06
3.05	.00	.49	67.8	.148E+02	.62	3.06
3.81	.00	.53	75.5	.132E+02	.77	3.06
4.57	.00	.58	82.5	.121E+02	.92	3.07
5.33	.00	.62	88.9	.112E+02	1.07	3.07
6.10	.00	.67	94.8	.105E+02	1.22	3.07
6.86	.00	.72	100.4	.996E+01	1.37	3.08
7.62	.00	.76	105.6	.947E+01	1.52	3.08

Simulative travel time = 101. sec

OF MOD277: UNSTABLE NEAR-FIELD ZONE OF ALTERNATING PERPENDICULAR DIFFUSER

End of NEAR-FIELD REGION (NFR) **

Attachment 15 1/24
ment q

EN MOD243: BUOYANT AMBIENT SPREADING

charge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

OF MOD241: BUOYANT AMBIENT SPREADING

IN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

vertical diffusivity (initial value) = .935E-02 m^2/s
horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

ofile definitions:

ofile definitions:
 $BV = \text{Gaussian s.d.} * \sqrt{\pi/2}$ (46%) thickness, measured vertically
 - or equal to layer depth, if fully mixed

BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
measured horizontally in Y-direction

z_u = upper plume boundary (Z-coordinate)

ZU = upper plume boundary (Z-coordinate)
 ZL = lower plume boundary (Z-coordinate)

ZL = lower plume boundary, (i.e., hydrodynamic centerline dilution effects, if any)

- centerline concentration (includes reaction effects, if any)

...use Stage 1 (not bank attached):

Volume	Stage	T	HOT	Bulk	ADM	S	C	BV	BH	ZU	ZL
X											
8.38		.00	1.52	105.4	.949E+01	1.52	3.08	1.52		.00	
28.42		.00	1.52	126.0	.794E+01	1.52	3.79	1.52		.00	
48.47		.00	1.52	143.4	.698E+01	1.52	4.39	1.52		.00	
68.51		.00	1.52	159.2	.628E+01	1.52	4.92	1.52		.00	
88.55		.00	1.52	174.1	.574E+01	1.52	5.39	1.52		.00	
108.59		.00	1.52	188.4	.531E+01	1.52	5.83	1.52		.00	
128.64		.00	1.52	202.3	.494E+01	1.52	6.24	1.52		.00	
148.68		.00	1.52	215.7	.464E+01	1.52	6.62	1.52		.00	
168.72		.00	1.52	228.8	.437E+01	1.52	6.98	1.52		.00	
188.76		.00	1.52	241.5	.414E+01	1.52	7.32	1.52		.00	
208.80		.00	1.52	253.8	.394E+01	1.52	7.65	1.52		.00	

208.80 100
Cumulative travel time = 1437. sec

lume Stage 2 (bank attached) :

Time	Stage	Z (mm)	X	Y	Z	S	C	BV	BH	ZU	EE
208.80	7.65	1.52	253.8	.394E+01	1.52	15.30	1.52	.00			
205.64	7.65	1.52	257.7	.389E+01	1.52	15.49	1.52	.00			

Cumulative travel time = 1616. sec

Model has been TERMINATED at last prediction interval.

ORMIX prediction has been TERMINATED at last prediction step.
Limiting distance due to TIDAL REVERSAL has been reached.

METHODS PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Attachment 16/24

DESCRIPTION ZAPATA^VA0003867
e name/label:
sign case:
E NAME: AFTER^SLACK^-^LONG^DIFFUSER
ie of Fortran run: cormix\sim\ZAPATA4 .cx2
09/16/98--15:18:57

ENVIRONMENT PARAMETERS (metric units)

inded section = 503.00 AS = 766.57 QA = 114.99 ICHREG= 1
 = 1.52 HD = 1.52
 ial Simulation at TIME = 1.000 h
 RIOD= 12.40 h UAMAX = .300 dUa/dt= .150 (m/s)/h
 = .150 F = .334 USTAR = .3065E-01
 = 2.000 UWSTAR= .2198E-02

iform density environment
RCND= U RHOAM = 999.7000

FUSER DISCHARGE PARAMETERS (metric units)
 fuser type: DITYPE= unidirectional perpendicular
 ffuser type: DISTB = 12.20 YB1 = 6.10 YB2 = 18.30
 NK = LEFT DISTB = 12.20 YB1 = 6.10 YB2 = 18.30
 = 12.20 NOOPEN = 8 SPAC = 1.74
 = .100 A0 = .008 HO = .28
 = .100 A0 = .008 HO = .28
 nozzle/port arrangement: unidirectional without fanning
 MMA = 90.00 THETA = 45.00 SIGMA = .00 BETA = 90.00
 = .208 Q0 = .013 = .1310E-01
 IOO = .996.3187 DRHOO = .3381E+01 GPO = .3317E-01
 = .1000E+04 CUNITS= PPB
 POLL = 1 KS = .0000E+00 KD = .0000E+00

JX VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)
 $m_0 = .1074E-02$ $j_0 = .2239E-03$ $\sigma_{j_0} = .3561E-04$ SIGNJ0= 1.0
 Associated 2-d length scales (meters)
 $l_M = .005$ $l_m = .21$ $l_a = .01$
 $\lambda_B = 99999.00$ $l_{bp} = 99999.00$ $l_{ap} = 99999.00$

JX VARIABLES - ENTIRE DIFFUSER (metric units)
 $\lambda = .1310E-01$ $M_0 = .2731E-02$ $J_0 = .4345E-03$
 Associated 3-d length scales (meters)
 $L = .25$ $L_M = .57$ $L_m = .35$ $L_b = .13$
 $L_{mp} = 99999.00$ $L_{bp} = 99999.00$
 $L_{min} = .174$
 Ideal: $T_u = .0864$ $h_u = 4.033$ $L_{min} = .174$

N-DIMENSIONAL PARAMETERS
 $R_0 = 15.95$ FRD0 = 3.62 R = 1.38
 slot) (port/nozzle)

XING ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

= .1000E+04 CUNITS= PPB
IX = 0
ID = 0
IMZ = 0
IT = 6000.00 XMAX = 6000.00

Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

12.20 m' from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.
IP = 10 display intervals per module

IN MOD201: DIFFUSER DISCHARGE MODULE

to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

file definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10

OF MOD201: DIFFUSER DISCHARGE MODULE

IN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY MIXED over the entire layer depth (HS = 1.52m).

Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

file definitions:

BV = layer depth (vertically mixed)

BH = top-hat half-width, in horizontal plane normal to trajectory

S = hydrodynamic average (bulk) dilution

C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10
.61	.00	.33	67.6	.148E+02	.15	6.09
1.22	.00	.38	94.5	.106E+02	.30	6.09
1.83	.00	.42	114.6	.873E+01	.46	6.09
2.44	.00	.47	131.1	.763E+01	.61	6.09
3.05	.00	.52	145.3	.688E+01	.76	6.08
3.66	.00	.57	157.9	.633E+01	.91	6.08
4.27	.00	.62	169.3	.591E+01	1.07	6.08
4.88	.00	.67	179.6	.557E+01	1.22	6.08
5.49	.00	.71	189.1	.529E+01	1.37	6.08
6.10	.00	.76	197.9	.505E+01	1.52	6.08

mulative travel time = 40. sec

OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

IN MOD251: DIFFUSER PLUME IN CO-FLOW

10/24
megaFact Sheet
attachment q

se 1: Vertically mixed, Phase 2: Re-stratified

se 2: The flow has RESTRATIFIED at the beginning of this zone.

This flow region is INSIGNIFICANT in spatial extent, and will be by-passed.

OF MOD251: DIFFUSER PLUME IN CO-FLOW

end of NEAR-FIELD REGION (NFR) **

IN MOD241: BUOYANT AMBIENT SPREADING

scharge is non-buoyant or weakly buoyant. Therefore BUOYANT SPREADING REGIME is ABSENT.

OF MOD241: BUOYANT AMBIENT SPREADING

IN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

permeability (initial value) = .935E-02 m^2/s

vertical diffusivity (initial value) = .117E-01 m^2/s
horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

file definitions:

file definitions:
 $BV = \text{Gaussian s.d.} * \sqrt{\pi/2}$ (46%) thickness, measured vertically
 or equal to layer depth, if fully mixed

BV = Gaussian = or equal to layer depth, if fully mixed
 $\approx 1.5 \times \text{depth}^{(1/2)}$ (16%) half-width

BH = Gaussian s.d.*sqrt(pi/2), (46%) half-width measured horizontally in Y-direction

ZU = upper plume boundary (Z-coordinate)

ZU = upper plume boundary (-)
ZL = lower plume boundary (Z-coordinate)

ZL = lower plume boundary
S = hydrodynamic centerline dilution
(includes reaction effects, if any)

S = hydrodynamic diameter
C = centerline concentration (includes reaction effects, if any)

June Stage 1 (not bank attached):

Lume	Stage	T (sec)	Bath	Actin	S	C	BV	BR	ZB	BB
X										
6.10	.00	1.52	197.9	.505E+01	1.52	6.12	1.52	.00		
51.64	.00	1.52	171.2	.584E+01	1.52	6.97	1.52	.00		
97.17	.00	1.52	180.0	.555E+01	1.52	7.73	1.52	.00		
142.71	.00	1.52	201.2	.497E+01	1.52	8.42	1.52	.00		
188.24	.00	1.52	228.7	.437E+01	1.52	9.05	1.52	.00		
210.07	.00	1.52	243.4	.412E+01	1.52	9.34	1.52	.00		
			1400	sec						

Cumulative travel time = 1400. sec

every prediction has been TERMINATED at last prediction in

LIMITING distance due to TIDAL REVERSAL has been reached

10.6.1 PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

20/24

Omega Fact Sheet

Attachment

9

= .1000E+04 CUNITS = PPB

X = 0

D = 0

EMZ = 0

IT = 6000.00 XMAX = 6000.00

Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

12.20 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

IP = 10 display intervals per module

IN MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.05	.05

OF MOD101: DISCHARGE MODULE (SINGLE PORT AT DIFFUSER CENTER)

IN CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

t/plume transition motion in weak crossflow.

ne of flow establishment:	THETAE=	45.00	SIGMAE=	.00
E = .00 XE = .00 YE = .00 ZE = .28				

ofile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory

BH = before merging: Gaussian 1/e (37%) half-width in horizontal plane
normal to trajectory

after merging: top-hat half-width in horizontal plane
parallel to diffuser line

S = hydrodynamic centerline dilution

C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
ndividual jet/plumes before merging:						
.00	.00	.28	1.0	.100E+04	.05	.05
.08	.00	.37	1.1	.900E+03	.06	.06
.15	.00	.46	1.4	.703E+03	.08	.08
.21	.00	.57	1.8	.566E+03	.09	.09
.26	.00	.67	2.2	.465E+03	.10	.10
.31	.00	.78	2.6	.390E+03	.11	.11
.35	.00	.89	3.0	.331E+03	.12	.12
.39	.00	1.01	3.5	.286E+03	.14	.14
.42	.00	1.12	4.0	.249E+03	.15	.15
.45	.00	1.24	4.6	.220E+03	.16	.16
.48	.00	1.35	5.1	.195E+03	.17	.17

imulative travel time = 6. sec

merging of individual jet/plumes not found in this module, but interaction
will occur in following module. Overall jet/plume interaction dimensions:

.48	.00	1.35	5.1	.195E+03	.17	6.15
-----	-----	------	-----	----------	-----	------

OF CORJET (MOD110): JET/PLUME NEAR-FIELD MIXING REGION

IN MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

21/24

Attachment - q

Vertical angle of layer/boundary impingement = 77.35° deg
Horizontal angle of layer/boundary impingement = .00 deg

scharge into STAGNANT AMBIENT environment:

STEADY-STATE MIXING CONDITION IS NOT POSSIBLE in this zone,
even though some ADDITIONAL DILUTION MAY OCCUR!

Also, all far-field processes will be UNSTEADY.
IMULATION STOPS because of stagnant ambient conditions.

OF MOD232: LAYER BOUNDARY IMPINGEMENT/UPSTREAM SPREADING

End of NEAR-FIELD REGION (NFR) **

EVACUATION STOPS because of STAGNANT AMBIENT conditions.

MULATION STOPS because of STAGNANT ANDER.
all far-field processes will be UNSTEADY.

4IX2: Submerged Multiport Diffuser Discharges End of Prediction File

22/24
Attachment q

1IX2 PREDICTION FILE:

CORNELL MIXING ZONE EXPERT SYSTEM

System CORMIX2: Subsystem-version:
Merged Multiport Diffuser Discharges CORMIX v.3.20 September 1996

3 DESCRIPTION

te name/label: ZAPATA^VA0003867
sign case: BEFORE^SLACK^-^LONG^DIFFUSER
LE NAME: cormix\sim\ZAPATA6 .cx2
me of Fortran run: 09/16/98--15:26:42

ENVIRONMENT PARAMETERS (metric units)

```

unded section
      = 503.00 AS      = 766.57 QA      = 114.99 ICHREG= 1
      = 1.52 HD      = 1.52
dal Simulation at TIME = -1.000 h
RIOD= 12.40 h UAmaz = .300 dUa/dt= .150 (m/s)/h
      = .150 F      = .334 USTAR = .3065E-01
      = 2.000 UWSTAR= .2198E-02

```

inform density environment
RCND= U RHOAM = 999.7000

FUSER DISCHARGE PARAMETERS (metric units)

FUSER DISCHARGE
 fuser type: DITYPE= unidirectional perpendicular
 NK = LEFT DISTB = 12.20 YB1 = 6.10 YB2 = 18.30
 = 12.20 NOOPEN = 8 SPAC = 1.74
 = .100 A0 = .008 H0 = .28
 nozzle/port arrangement: unidirectional without fanning
 MMA = 90.00 THETA = 45.00 SIGMA = .00 BETA = 90.00
 = .208 Q0 = .013 = .1310E-01
 RHO = 996.3187 DRHO0 = .3381E+01 GPO = .3317E-01
 = .1000E+04 CUNITS= PPB
 POLL = 1 KS = .0000E+00 KD = .0000E+00

IV. VARIABLES - PER UNIT DIFFUSER LENGTH (metric units)

IX VARIABLES - PER UNIT DIFFUSER LENGTH
 $m_0 = .1074E-02$ $m_0 = .2239E-03$ $j_0 = .3561E-04$ $SIGNJ_0 = 1.0$
 Associated 2-d length scales (meters)
 $l_M = .005$ $l_M = .21$ $l_M = .01$
 $l_{bp} = 99999.00$ $l_{bp} = 99999.00$ $l_{bp} = 99999.00$

IV VARIABLES - ENTIRE DIFFUSER (metric units)

```

)      = .1310E-01 M0      = .2731E-02 J0      = .4345E-03
)      = .25 LM      = .57 Lm      = .35 Lb      = .13
)      = .0864 h Lu      = 4.033 Lmin      = .174

```

I-DIMENSIONAL PARAMETERS

(port/nozzle)

IV. CLASSIFICATION

WIND ZONE / TOXIC DILUTION / REGION OF INTEREST PARAMETERS

= .1000E+04 CUNITS= PPB
DX = 0
ID = 0
GMZ = 0
NT = 6000.00 XMAX = 6000.00

-Z COORDINATE SYSTEM:

ORIGIN is located at the bottom and the diffuser mid-point:

12.20 m from the LEFT bank/shore.

X-axis points downstream, Y-axis points to left, Z-axis points upward.

EP = 10 display intervals per module

IN MOD201: DIFFUSER DISCHARGE MODULE

re to complex near-field motions: EQUIVALENT SLOT DIFFUSER (2-D) GEOMETRY

Profile definitions:

BV = Gaussian 1/e (37%) half-width, in vertical plane normal to trajectory
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic centerline dilution
C = centerline concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10

D OF MOD201: DIFFUSER DISCHARGE MODULE

GIN MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

In this laterally contracting zone the diffuser plume becomes VERTICALLY FULLY MIXED over the entire layer depth (HS = 1.52m).
Full mixing is achieved after a plume distance of about five layer depths from the diffuser.

Profile definitions:

BV = layer depth (vertically mixed)
BH = top-hat half-width, in horizontal plane normal to trajectory
S = hydrodynamic average (bulk) dilution
C = average (bulk) concentration (includes reaction effects, if any)

X	Y	Z	S	C	BV	BH
.00	.00	.28	1.0	.100E+04	.00	6.10
.61	.00	.33	68.1	.147E+02	.15	6.09
1.22	.00	.38	95.8	.104E+02	.30	6.09
1.83	.00	.42	116.9	.855E+01	.46	6.09
2.44	.00	.47	134.7	.742E+01	.61	6.09
3.05	.00	.52	150.3	.665E+01	.76	6.08
3.66	.00	.57	164.3	.609E+01	.91	6.08
4.27	.00	.62	177.2	.564E+01	1.07	6.08
4.88	.00	.67	189.1	.529E+01	1.22	6.08
5.49	.00	.71	200.3	.499E+01	1.37	6.08
6.10	.00	.76	210.8	.474E+01	1.52	6.08

Cumulative travel time = 40. sec

ID OF MOD271: ACCELERATION ZONE OF UNIDIRECTIONAL CO-FLOWING DIFFUSER

GIN MOD251: DIFFUSER PLUME IN CO-FLOW

Phase 1: Vertically mixed, Phase 2: Re-stratified

case 2: The flow has RESTRATIFIED at the beginning of this zone.

is flow region is INSIGNIFICANT in spatial extent and will be by-passed.

OF MOD251: DIFFUSER PLUME IN CO-FLOW

End of NEAR-FIELD REGION (NFR) **

IN MOD241: BUOYANT AMBIENT SPREADING

charge is non-buoyant or weakly buoyant.
Therefore BUOYANT SPREADING REGIME is ABSENT.

OF MOD241: BUOYANT AMBIENT SPREADING

SIN MOD261: PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

Vertical diffusivity (initial value) = .935E-02 m^2/s
Horizontal diffusivity (initial value) = .117E-01 m^2/s

The passive diffusion plume is VERTICALLY FULLY MIXED at beginning of region.

profile definitions:

profile definitions:
BV = Gaussian s.d.*sqrt(pi/2) (46%) thickness, measured vertically
= or equal to layer depth, if fully mixed

BH = Gaussian s.d.*sqrt(pi/2) (46%) half-width,
 measured horizontally in Y-direction

ZII = upper plume boundary (Z-coordinate)

ZU = upper plume boundary (Z-coordinate)
ZL = lower plume boundary (Z-coordinate)

ZL = lower plume boundary
 S = hydrodynamic centerline dilution
 C = centerline concentration (includes reaction effects, if any)

lume Stage 1 (not bank attached):

Stage	Time	X	Y	Z	S	C	BV	BH	Z0	z1
1	0.00	1.52	210.8	.474E+01	1.52	6.12	1.52	.00	.00	
6.10	.00	1.52	227.8	.439E+01	1.52	6.97	1.52	.00	.00	
11.64	.00	1.52	249.6	.401E+01	1.52	7.73	1.52	.00	.00	
17.17	.00	1.52	273.5	.366E+01	1.52	8.42	1.52	.00	.00	
22.71	.00	1.52	297.7	.336E+01	1.52	9.05	1.52	.00	.00	
28.24	.00	1.52	321.4	.311E+01	1.52	9.65	1.52	.00	.00	
33.78	.00	1.52	323.5	.309E+01	1.52	9.70	1.52	.00	.00	
38.07	.00	1.52								

Cumulative travel time = 1587. sec

Model has been TERMINATED at last prediction interval.

ORMIX prediction has been TERMINATED at last point.
Limiting distance due to TIDAL REVERSAL has been reached.

SECTION 2 PASSIVE AMBIENT MIXING IN UNIFORM AMBIENT

- 1 -
- 1 - Diffusex Discharges

End of Prediction File

04/17/00 07:46

b

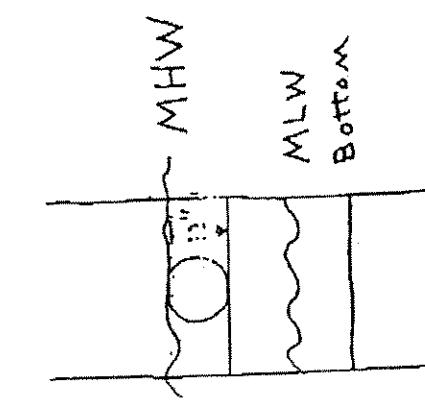
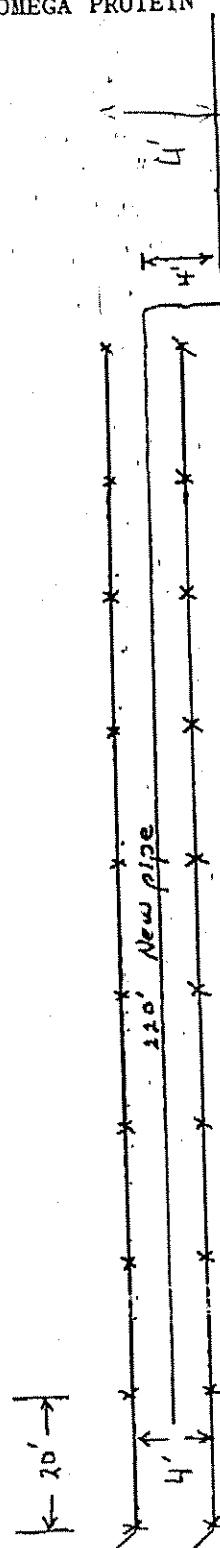
OMEGA PROTEIN

003/003

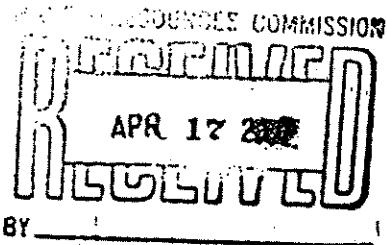
Omega Protein
Attachment 9

Cross Section View 002 Diffuser
Omega Protein
Shown without walkway
Not to scale

Existing pipe
from lagoon



ADDITIONAL INFO
REVISION



04/17/00 07:45

OMEGA PROTEIN

002/003

ADDITIONAL INFO
REVISION

MARINE RESOURCES COMMISSION

PROTIN D
MAR 17 2000
REVISION

BY

45-6 04' RD
NEW 12' PIPE LINE
4' TO 16' WATER DEPTH
220' 240'

002
diffuser

COCKRELL CREEK

flow

DISTING CONCERN BURIED

SORTIMENT OF WATER LINE

SORTIMENT OF PIPE LINE

PLAN VIEW

SCALE 1:40'-0"

BEST ENGINEERING JUDGMENT BASED ON TECHNOLOGY BASED LIMITATION CALCULATIONS

EPA proposed Effluent Limitation Guidelines (ELG) for fish meal processing facilities; however the rule was never promulgated. Using best engineering judgment, the proposed fish meal ELG are determined to be an appropriate option to derive limitations from the fish processing plant.

Technology Limitation calculations – based on ELG and production reported on Form 2C. 4.0 Million lbs/d (1,814,369 kg/d).
 Technology Limitations = (Production * Multiplier)/1000

Outfall 002

		Multiplier (kg/1000 kg)	Calculated Limit (kg/d)
BOD₅	Avg	3.9	7100
	Max	7	13000
TSS	Avg	1.5	2700
	Max	3.7	6700
O&G	Avg	0.76	1400
	Max	1.4	2500

WATER QUALITY BASED LIMITATION (WQBL) CACULATIONS

The 1976 VIMS model reported that loading to Cockrell Creek cannot exceed 5000 lb/d of cBOD₅ in order to protect water quality of the creek. The two menhaden plants (Zapata and Ampro, now merged as Omega) were allocated 4900 lb/day (2222.22 kg/d) of cBOD₅. In order to calculate WQBL, it is necessary to assume that all cBOD₅ is equal to BOD₅. Because cBOD is only one component of the total oxygen demanding process, this would reflect a conservative limiting assumption regarding cBOD₅ loading. This is necessary because the ELG provide production based effluent emission factors in terms of BOD₅ and ratios from the ELG were used in the derivation of WQBL for TSS and Oil and Grease. Also it is necessary to perform WQBL calculation in terms of BOD₅ for purposes of comparison to the technology derived limitations to determine the more restrictive of technology based limitation or water quality based limitations.

ELG Multipliers (kg/ 1000 kg)

	Average	Maximum
BOD ₅	3.9	7.0
TSS	1.5	3.7
O&G	0.76	1.4

The VIMS WLA of BOD₅ was used in calculation of maximum loading limitations. The ELG ratio of max BOD multiplier (7) to average BOD₅ multiplier (3.9) was calculated and multiplied by the average BOD₅ WLA to calculate a maximum BOD₅ WLA.

4900 lb/d* (7/3.9) = 8794.872 lb/d max WLA based on VIMS model WLA

To calculate loading limitations of TSS and Oil and Grease to determine WQBL, the BOD₅ WLA was multiplied by the ratio of multipliers from the ELG of TSS to BOD₅ and Oil and Grease to BOD₅:

TSS Average: 4900 lb/d * (1.5 TSS/3.9 BOD₅) / 2.205 kg/lb = 854.7009 kg/d

TSS Maximum: 8794.872 lb/d* (3.7 TSS/7.0 BOD₅)/2.205 kg/lb = 2108.262 kg/d

O&G Average: 4900 lb/d * (0.76 O&G/3.9 BOD₅) / 2.205 kg/lb = 433.0484 kg/d O&G

O&G Maximum: 8794.872 lb/d * (1.4 O&G/7.0 BOD₅) / 2.205 kg/lb = 797.7208 kg/d O&G

Comparison and Limitation Determination (kg/d)

		BPJ	WQBL	Previous Permit Limits*
BOD₅	Mo. Avg	7100	2200	470
	Max	13000	8800	840
TSS	Mo. Avg	2700	850	160
	Max	6700	2100	410
O&G	Mo. Avg	1400	430	25
	Max	2500	800	46

* See attached documentation showing how previous permit limitations were calculated.

The previous permit limitations were calculated using similar methods to the WQBL calculation as described above. At the time that those limitations were calculated the facility discharged wastewater from Outfall 001 (contact cooling water) and limitations were based on proportions of loading from Outfall 001 and Outfall 002.

Based on the anti-backsliding policy (9 VAC 25-31-220 L), permits may not be renewed, reissued or modified to contain effluent limitations which are less stringent than the comparable effluent limits in the previous permit with some exceptions including material and substantial alterations at the facility. The elimination of Outfall 001 is not considered a material and substantial alteration to the treatment train at Outfall 002 and is not related to the ability to achieve water quality performance levels previously demonstrated at Outfall 002. Therefore, the limitations for BOD₅, TSS, and O&G contained in the previous permit will be carried forward with this permit renewal with a basis of best professional judgment. Explanation of the previous permit limitation is attached.

HOWEVER, WQS DICTATE TOTAL ALLOWABLE BOD DISCHARGE TO CREEK IS 4091 LB/DAY AFTER THE WLA FOR THE REEDVILLE WWTP HAS BEEN SUBTRACTED. FRED CUNNINGHAM'S FACT SHEET DATED 8/28/84 ALLOWED A TOTAL OF 2223 KGD. THIS HAS BEEN ALLOCATED IN ITS ENTIRETY TO OMEGA PROTEIN WITH THE 1987 PERMIT MODIFICATION.

THEREFORE THE SUM OF BOD FOR 001 AND 002, THE TWO PROCESS OUTFALLS DISCHARGING TO CREEK, CANNOT EXCEED 2223 KGD, AND WQS LIMITS APPLY TO THESE 2 OUTFALLS. 003 IS LIMITED BY TECHNOLOGY LIMITS.

		Kg/d	Scrubber 001 5.3.037 MGD	Lagoon 002 0.26 0.26 MGD
BODs	Avg	2223	001 BOD Loading Total Loading $\frac{2223}{160/182.2} = .7866$ $= .7866$ $160/182.2 = 0.8782$	002 BOD Loading/Total Loading = 0.2404 $2222 \times .8782 = 1952.24$ use 1755, rounded to 1700 Kg/d
Total BOD Loading* = 6598 + 146 = 6744 160 + 22.2 = 182.2 kg/d	Max	3979	3879 x .7866 = 3142 3979 x .8782 = 3494.36 use 3142, rounded to 3100	3969 x .1218 = 485.86 use 837, rounded to 840 Kg/d
TSS	Avg	826	001 TSS Loading/Total Loading $\frac{826}{199/249.8} = .7986$ $= .7986$	002 TSS Loading/Total Loading = 0.26746 $826 \times .7986 = 657.99$ use 655, rounded to 650 Kg/d
Total TSS Loading* = 446 + 106 = 552 199/50.8 = 249.8 kg/d	Max	2031	4669 2031 x .7986 = 1617.89 use 1609, rounded to 1600	2031 x .2034 = 413.11 use 413, rounded to 410 Kg/d
O&G	Avg	400	001 O&G Loading Total Loading $\frac{400}{54.3/57.9} = .6409$ $= .6409$	002 O&G Loading/Total Loading = 0.0694 $400 \times .9378 = 375$ use 372, rounded to 370 Kg/d
Total O&G Loading* = 404 + 7.6 = 408.6 54.3 + 3.6 = 57.9 Kg/d	Max	736	696 736 x .9378 = 690 use 685, rounded to 680	736 x .0622 = 45.76 use 45.8, rounded to 46 Kg/d



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TITLE 40—Protection of Environment

PART 408—CANNED AND PRESERVED SEAFOOD PROCESSING POINT SOURCE CATEGORY

SUBPART O—Fish Meal Processing Subcategory

Source: 40 FR 55781, Dec. 1, 1975, unless otherwise noted.

§ 408.150 Applicability; description of the fish meal processing subcategory.

The provisions of this subpart are applicable to discharges resulting from the processing of menhaden on the Gulf and Atlantic Coasts and the processing of anchovy on the West Coast into fish meal, oil and solubles.

§ 408.151 Specialized definitions.

For the purpose of this subpart:

408.151(a)

Except as provided below, the general definitions, abbreviations and methods of analysis set forth in part 401 of this chapter shall apply to this subpart.

408.151(b)

The term *seafood* shall mean the raw material, including freshwater and saltwater fish and shellfish, to be processed, in the form in which it is received at the processing plant.

§ 408.152 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

Except as provided in §§125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available (BPT):

408.152(a)

Any menhaden or anchovy fish meal reduction facility which utilizes a solubles plant to process stick water or bail water shall meet the following limitations.

Effluent characteristic	Effluent limitations		
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—	
Metric units (kilograms per 1,000 kg of seafood)			
BOD 5	7.0		3.9
TSS	3.7		1.5
Oil and grease	1.4		0.76
pH	(¹)		(¹)
English units (pounds per 1,000 lb of seafood)			
BOD 5	7.0		3.9
TSS	3.7		1.5
Oil and grease	1.4		0.76
pH	(¹)		(¹)

¹ Within the range 6.0 to 9.0.

408.152(b)

Any menhaden or anchovy fish meal reduction facility not covered under §408.152(a) shall meet the following limitations:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Metric units (kg/kkg of seafood)		
BOD 5	3.5	2.8
TSS	2.6	1.7
Oil and grease	3.2	1.4
pH	(¹)	(¹)
English units (lb/1,000 lb of seafood)		
BOD 5	3.5	2.8
TSS	2.6	1.7
Oil and grease	3.2	1.4
pH	(¹)	(¹)

¹ Within the range 6.0 to 9.0.

[40 FR 55781, Dec. 1, 1975, as amended at 41 FR 31821, July 30, 1976; 60 FR 33943, June 29, 1995]

§ 408.153 [Reserved]

§ 408.154 Pretreatment standards for existing sources.

Any existing source subject to this subpart that introduces process wastewater pollutants into a publicly owned treatment works must comply with 40 CFR part 403. In addition, the following pretreatment standard establishes the quantity or quality of pollutants or pollutant properties controlled by this section which may be discharged to a publicly owned treatment works by a point source subject to the provisions of this subpart.

Pollutant or pollutant property	Pretreatment standard
BOD 5	No limitation.
TSS	Do.
pH	Do.
Oil and grease	Do.

[40 FR 55781, Dec. 1, 1975, as amended at 60 FR 33943, June 29, 1995]

§ 408.155 Standards of performance for new sources.

The following standards of performance establish the quantity or quality of pollutants or pollutant properties, controlled by this section, which may be discharged by a new source subject to the provisions of this subpart:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days shall not exceed—
Metric units (kilograms per 1,000 kg of seafood)		
BOD 5	6.7	3.8
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(¹)	(¹)
English units (pounds per 1,000 lb of seafood)		
BOD 5	6.7	3.8
TSS	3.7	1.5
Oil and grease	1.4	0.76
pH	(¹)	(¹)

¹ Within the range 6.0 to 9.0.

[40 FR 55781, Dec. 1, 1975, as amended at 41 FR 31821, July 30, 1976]

§ 408.156 Pretreatment standards for new sources.

Any new source subject to this subpart that introduces process wastewater pollutants into a publicly owned treatment works must comply with 40 CFR part 403. In addition, the following pretreatment standard establishes the quantity or quality of pollutants or pollutant properties controlled by this section which may be discharged to a publicly owned treatment works by a new source subject to the provisions of this subpart:

Pollutant or pollutant property	Pretreatment standard
BOD 5	No limitation.
TSS	Do.
pH	Do.
Oil and grease	Do.

[40 FR 55781, Dec. 1, 1975, as amended at 60 FR 33944, June 29, 1995]

§ 408.157 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT).

Except as provided in §§125.30 through 125.32, any existing point source subject to this subpart shall achieve the following effluent limitations representing the degree of effluent reduction attainable by the application of the best conventional pollutant control technology (BCT): The limitations shall be the same as those specified for conventional pollutants (which are defined in §401.16) in §408.152 of this subpart for the best practicable control technology currently available (BPT).

[51 FR 24997, July 9, 1986]

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ISSN 1529-7918

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Outfall 002 DMR Data

	Loading		Concentration		
Units (unless otherwise noted)	kg/d		mg/L		
	Avg	Max	Avg	Min	Max
FLOW (MGD)	0.33	0.567			
	0.096	0.262			
	0.145	0.372			
	0.135	0.276			
	0.128	0.219			
	0.104	0.275			
	0.094	0.17			
	0.078	0.119			
	0.221	0.356			
	0.232	0.278			
	0.139	0.244			
	0.158	0.301			
	0.132	0.202			
	0.122	0.246			
	0.118	0.205			
	0.148	0.201			
	0.177	0.245			
	0.151	0.224			
	0.161	0.226			
	0.141	0.294			
	0.142	0.296			
	0.106	0.188			
	0.066	0.108			
	0.153	0.179			
	0.203	0.364			
	0.177	0.272			
	0.177	0.367			
	0.161	0.258			
	0.147	0.209			
	0.124	0.254			
	0.172	0.388			
	0.15	0.346			
	0.122	0.218			
	0.116	0.211			
	0.09	0.14			
	0.09	0.206			
	0.07	0.17			
	0.078	0.1			
PH (S.U.)			8.7	8.97	
			7.49	8.29	
			7.47	8.13	
			7.4	8.16	
			7.36	8.34	
			7.62	8.55	
			7.59	8.16	
			79.5	8.5	
			7.03	7.42	
			7.68	8.18	
			7.46	8.52	
			7.5	8.5	
			7.8	8.2	
			7.6	8.5	
			7.68	8.66	

Average: 0.140894737 MGD
 Maximum: 0.567 MGD

			8.25	8.42	
			8.14	8.88	
			7.68	8.42	
			7.55	7.97	
			7.51	8.02	
			6.89	8.33	
			7.46	8.53	
			7.72	8.31	
			6.57	6.79	
			6.72	7.75	
			6.5	7.65	
			6.34	8.31	
			6.12	7.97	
			6.17	7.19	
			6.25	7.1	
			6.62	7.48	
			6.76	8.22	
			6.85	8.45	
			6.55	7.87	
			6.52	6.96	
			6.6	7.49	
			6.5	7	10th Percentile of Max:
			6.9	7	90th Percentile of Max:
BOD5	13.9	13.9			7.07 S.U.
	13.5	13.8			8.536 S.U.
	1.4	1.6			
	17.65	30.48			
	21.7	29.5			
	9.1	11.7			
	15.1	27.3			
	3.4	4.9			
	18.4	22.6			
	6.5	10.1			
	9.6	9.8			
	23.6	35.6			
	4.6	7.9			
	2.7	4.5			
	10.3	14.3			
	12.7	15.9			
	7.57	7.57			
	16	25			
	9.85	13.7			
	12.2	16.1			
	9.52	15.5			
	5.24	10.1			
	6.7	6.7			
	5.22	5.22			
	13	19.2			
	4.8	9.7			
	58.2	116.4			
	14.5	26.9			
	2.94	2.99			
	<QL	<QL			
	2.14	4.28			
	<3.1	6.2			
	3.34	4.59			
	10.5	19.2			

	0.965	1.93		
	0.749	1.5		
	1	2		
TSS	21.9	21.9		
	22	24.8		
	1.7	2.1		
	10.27	15.67		
	34	47.7		
	15.5	17.6		
	7.5	12.4		
	4.7	4.8		
	41.2	56.6		
	5.4	9.4		
	12	14.5		
	42.3	51.7		
	8.1	14.6		
	6.5	10.8		
	17.7	23.9		
	16.5	22.3		
	31.3	31.3		
	33.2	49.1		
	14.8	19.4		
	17.7	25.6		
	8.21	9.97		
	4.73	9.16		
	12.5	12.5		
	4.61	4.61		
	5.23	5.41		
	6.6	10.2		
	5.34	7.23		
	2.2	2.7		
	14.4	27.9		
	1.1	1.2		
	4.12	5.13		
	4.7	4.8		
	5.72	8.41		
	2.2	3.8		
	2.4	2.51		
	2.5	3		
	7	11		
COLIFORM, FECAL (N/100 mL)			144	
			424	
			757	
			518	
			443	
			702	
			219	
			15	
			162	
			1386	
			1426	
			1200	
			323	
			616	
			100	
			130	
			92	
			222	

		126	
		685	
		342	
		50	
		11	
		14	
		0.1	
		8.5	
		1	
		39	
		18	
		0	
		<2	
		<2	
		0	
		<2	
		<1	
		<QL	
PHOSPHORUS, TOTAL (AS P)	2.5	5.2	
	0.4	1.7	
	0.484	1.596	
	0.32	0.84	
	0.11	0.32	
	0.23	0.61	
	0.15	0.85	
	5.7	5.2	
	2.8	3.4	
	1.3	5.5	
	2.2	5	
	0.5	2	
	0.6	2.3	
	0.8	1.67	
	0.7	0.95	
	2.54	4.19	
	6.99	9.78	
	0.85	1.67	
	0.9	1.84	
	0.76	2.33	
	0.51	2.22	
	1.29	3.16	
	0.1	0.14	
	0.18	0.19	
	0.24	0.36	
	0.12	0.18	
	0.05	0.09	
	0.06	0.1	
	0.001	0.003	
	0.04	0.09	
	0.21	0.09	
	0.22	0.56	
	0.07	0.15	
	0.04	0.1	
	0.1	0.03	
	0.1	0.3	
NITROGEN, TOTAL (AS N)	4.8	13.2	
	6.3	22.4	
	45.01	126.4	
	44	102.2	

	12.7	30.6	
	8.72	21	
	4.75	27.4	
	15.6	14.5	
	18.8	22.9	
	6.8	28.2	
AMMONIA, AS N		1.2	1.3
		8.8	9.7
		89.1	125
		61.5	109
		8.97	12.9
		4.43	5.88
		3.7	6.2
		5.5	5.6
		14.9	17.5
		19.2	21.2
		7.4	8.4
		9	16.9
		1.6	2.2
		0.9	0.9
		2.6	4.93
		1.75	1.75
		8.95	15.6
		16.1	18.3
		1.6	1.7
		0.78	1.3
		0.74	1.47
		11.1	11.1
		0.97	0.97
		0.82	0.85
		1.9	3.38
		4.4	8.7
		14.1	15.6
		21	23.2
		34	37.8
		7.5	8.9
		11.6	13
		29.2	36.3
		23.8	24.4
		16.8	18.8
		22.3	28
		34	45
TKN (N-KJEL)	4.2	11.7	
	5.8	20.6	
	44.819	124.98	
	37.2	84.5	
	4.9	12.1	
	3.91	9.06	
	1.28	7.72	
	14.2	13.2	
	17.2	20.9	
	6.4	26	
TEMPERATURE, WATER (DEG. C)		4.41	4.7
		24.5	27.6
		27.5	30.4
		8.02	8.16
		22.6	25.2
		17.1	24

		14.2	15.3
		7.98	10.3
		21	22.8
		25	27.9
		27.1	31.2
		27.7	31.4
		24.8	27.7
		21.8	25.8
		13.8	17
		8.7	11.3
		28	29.4
		26.2	30.5
		26.8	30.3
		24.2	28.4
		20.5	23.3
		11.08	14.5
		8.52	10.2
		24.3	25.4
		26.4	28.5
		27.4	30.4
		29.8	31.9
		24.8	28.2
		18.8	25
		15.4	16.5
		23.1	27.1
		28.1	30.9
		29.1	31.3
		28.5	31.3
		25.3	29.7
		18.9	21.5
		14	15
		13	14.3
ENTEROCOCCI (N/100 mL)		189	
		440	
		2400	
		983.4	
		2420	
		2420	
		2420	
		31	
		200	
		331.7	
		1487	
		2420	
		496	
		229	
		119	
		>2420	
		>2420	
		1709	
		742	
		2420	
		2420	
		248	
		29	
		25	
		31.8	
		2.6	

90th Percentile of
Max:

31.23 °C

	<QL	<QL			
	<QL	<QL			
	<10	<10			
	<10	<10			
	<5	<5			
	<5	<5			
	<5	<5			
	<1.5	<1.5			
	<5	<5			
	<QL	<QL			
	<QL	<QL			
NITROGEN, TOTAL (AS N) (MONTHLY LOAD) (kg/mo)		96.8			
		138.6			
		1170.2			
		704.6			
		330.7			
		48.1			
		47.5			
		NULL			
		46.9			
		320			
		190			
NITROGEN, TOTAL (AS N) (CALENDAR YEAR) (kg/yr)		2542			
PHOSPHORUS, TOTAL (AS P) (MONTHLY LOAD) (kg/mo)		50.8			
		9.4			
		12.1			
		5.12			
		0.11			
		2.34			
		1.5			
		17.1			
		47.9			
		37.4			
PHOSPHORUS, TOTAL (AS P) (CALENDAR YEAR) (kg/yr)		90.2			
ORTHOPHOSPHATE (AS P)	0.9	2.1			
	0.3	1.1			
	0.165	0.56			
	0.18	0.41			
	0.02	0.1			
	0.16	0.43			
	0.13	0.72			
	4.6	4.2			
	2.3	2.7			
	1.6	4.9			
NITROGEN, TOTAL (AS N) (YTD) (kg/yr)		50.4			
		50.4			
		50.4			
		50.4			
		147.2			
		285.8			
		1411			
		2115			

		2446		
		2494		
		2542		
		46.9		
		367.3		
		557.6		
PHOSPHORUS, TOTAL (AS P) (YTD) (kg/r)		6.1		
		6.1		
		6.1		
		6.1		
		56.9		
		66.3		
		78.4		
		83.5		
		86.4		
		88.7		
		90.2		
		17.1		
		65		
		102.4		

VA0003867 – Omega Protein Inc.

MSTRANTI DATA SOURCE REPORT FOR OUTFALL 002

Stream Information:	Basis
Mean Hardness	Not Applicable for Salt Water
90 th % Temperature (Annual)	Ambient Data for Station 7-COC001.61
90 th % Temperature (Winter)	No Tiered Limitations, Not Applicable
90 th % Maximum pH	Ambient Data for Station 7-COC001.61
10 th % Maximum pH	Ambient Data for Station 7-COC001.61
Tier Designation	Flow Frequency Memorandum
Mean Salinity	Ambient Data for Station 7-COC001.61
Mixing Information:	
Design Flow	Maximum 30 Day Value as Reported in Form 2C Application
Acute WLA Multiplier	Diffuser Model Documentation September 1998
Chronic WLA Multiplier	
Human Health WLA Multiplier	
Effluent Information:	
Mean Hardness	Not Applicable for Salt Water
90 th % Temperature (Annual)	DMR Effluent Data
90 th % Temperature (Winter)	No Tiered Limitations, Not Applicable
90 th % Maximum pH	DMR Effluent Data
10 th % Maximum pH	
Discharge Flow	Maximum 30 Day Value as Reported in Form 2C Application

SALTWATER AND TRANSITION ZONES

WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Omega Protein Outfall 002
 Receiving Stream: Cockrells Creek

Permit No.: VA0003867

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Mixing Information			Effluent Information				
Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria	Wasteload Allocations	Antidegradation Baseline	Antidegradation Allocations	Most Limiting Allocations			
	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Acenaphthene	0	--	9.9E+02	--	9.9E+04	--	--	--	--
Acrolein	--	9.3E+00	--	9.3E+02	--	--	--	--	9.3E+02
Acrylonitrile ^C	--	2.5E+00	--	2.5E+02	--	--	--	--	2.5E+02
Aldrin ^C	0	1.3E+00	5.0E-04	1.3E+02	5.0E-02	--	--	1.3E+02	5.0E-02
Ammonia-N (mg/l) - Annual	0	#####	1.99E-01	--	1.32E+02	1.99E+01	--	--	1.32E+02
Ammonia-N (mg/l) - Winter	0	#VALUE! #VALUE!	--	#VALUE! #VALUE!	--	--	--	#VALUE!	#VALUE!
Anthracene	0	--	4.0E+04	--	4.0E+06	--	--	--	4.0E+06
Antimony	0	--	6.4E+02	--	6.4E+04	--	--	--	6.4E+04
Arsenic	0	6.9E+01	3.6E+01	--	6.9E+03	3.6E+03	--	--	6.9E+03
Benzene ^C	0	--	5.1E+02	--	5.1E+04	--	--	--	5.1E+04
Benzidine ^C	--	2.0E-03	--	2.0E-01	--	--	--	--	2.0E-01
Benzo (a) anthracene ^C	0	--	1.8E-01	--	1.8E+01	--	--	--	1.8E+01
Benzo (b) fluoranthene ^C	0	--	1.8E-01	--	1.8E+01	--	--	--	1.8E+01
Benzo (k) fluoranthene ^C	0	--	1.8E-01	--	1.8E+01	--	--	--	1.8E+01
Benzo (a) pyrene ^C	0	--	1.8E-01	--	1.8E+01	--	--	--	1.8E+01
Bis2-Chloroethyl Ether ^C	0	--	5.3E+00	--	5.3E+02	--	--	--	5.3E+02
Bis2-Chloroisopropyl Ether	0	--	6.5E+04	--	6.5E+06	--	--	--	6.5E+06
Bis2-Ethylhexyl Phthalate ^C	0	--	2.2E+01	--	2.2E+03	--	--	--	2.2E+03
Bromoform ^C	0	--	1.4E+03	--	1.4E+05	--	--	--	1.4E+05
Butylbenzylphthalate	0	--	1.9E+03	--	1.9E+05	--	--	--	1.9E+05
Cadmium	0	4.0E+01	8.8E+00	--	4.0E+03	8.8E+02	--	--	4.0E+03
Carbon Tetrachloride ^C	0	--	1.6E+01	--	1.6E+03	--	--	--	1.6E+03
Chlordane ^C	0	9.0E-02	4.0E-03	8.1E-03	9.0E+00	4.0E-01	8.1E-01	--	9.0E+00

Mean Hardness (as CaCO3) =	NA	ng/l	0.265	Mean Hardness (as CaCO3) =	NA	mg/L
90th % Temperature (Annual) =	28.6	(°C)	100	90 % Temperature (Annual) =	31.23	(°C)
90th % Temperature (Winter) =	NA	(°C)	100	90 % Temperature (Winter) =	NA	(°C)
90th % Maximum pH =	8.4		100	90 % Maximum pH =	8.536	SU
10th % Maximum pH =	7.7			10 % Maximum pH =	7.07	SU
Tier Designation (1 or 2) =	1			Discharge Flow =	0.265	MGD

Early Life Stages Present Y/N = 1 (1 = saltwater, 2 = transition zone)

Tidal Zone = 16.2 (g/kg)

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Waste Load Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations				
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH		
TRC	0	1.3E+01	7.5E+00	-	1.3E+03	7.5E+02	-	-	-	-	-	-	-	1.3E+03	7.5E+02	-		
Chlorine Prod. Oxidant	0	-	-	1.6E+03	-	-	1.6E+05	-	-	-	-	-	-	-	-	1.6E+05		
Chlorobenzene	0	-	-	1.3E+02	-	-	1.3E+04	-	-	-	-	-	-	-	-	1.3E+04		
Chlorodibromomethane ^c	0	-	-	1.1E+04	-	-	1.1E+06	-	-	-	-	-	-	-	-	1.1E+06		
Chloroform	0	-	-	1.6E+03	-	-	1.6E+05	-	-	-	-	-	-	-	-	1.6E+05		
2-Chloronaphthalene	0	-	-	1.5E+02	-	-	1.5E+04	-	-	-	-	-	-	-	-	1.5E+04		
2-Chlorophenol	0	-	-	1.1E+02	5.6E-03	-	1.1E+00	5.6E-01	-	-	-	-	-	1.1E+00	5.6E-01	-		
Chlorpyrifos	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium III	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Chromium VI	0	1.1E+03	5.0E+01	-	1.1E+05	5.0E+03	-	-	-	-	-	-	-	1.1E+05	5.0E+03	-		
Chrysene ^c	0	-	-	1.8E-02	-	-	1.8E+00	-	-	-	-	-	-	-	-	1.8E+00		
Copper	0	9.3E+00	6.0E+00	-	9.3E+02	6.0E+02	-	-	-	-	-	-	-	9.3E+02	6.0E+02	-		
Cyanide, Free	0	1.0E+00	1.0E+00	1.6E+04	1.0E+02	1.0E+02	1.6E+06	-	-	-	-	-	-	1.0E+02	1.0E+02	1.6E+06		
DDD ^c	0	-	-	3.1E-03	-	-	3.1E-01	-	-	-	-	-	-	-	-	3.1E-01		
DDE ^c	0	-	-	2.2E-03	-	-	2.2E-01	-	-	-	-	-	-	-	-	2.2E-01		
DDT ^c	0	1.3E-01	1.0E-03	2.2E-03	1.3E+01	1.0E-01	2.2E-01	-	-	-	-	-	-	1.3E+01	1.0E-01	2.2E-01		
Demeton	0	-	1.0E-01	-	-	1.0E-01	-	-	-	-	-	-	-	-	1.0E-01	-		
Diazinon	0	8.2E-01	8.2E-01	-	8.2E+01	8.2E+01	-	-	-	-	-	-	-	8.2E+01	8.2E+01	-		
Dibenz(a,h)anthracene ^c	0	-	-	1.8E-01	-	-	1.8E+01	-	-	-	-	-	-	-	-	1.8E+01		
1,2-Dichlorobenzene	0	-	-	1.3E+03	-	-	1.3E+05	-	-	-	-	-	-	-	-	1.3E+05		
1,3-Dichlorobenzene	0	-	-	9.6E+02	-	-	9.6E+04	-	-	-	-	-	-	-	-	9.6E+04		
1,4-Dichlorobenzene	0	-	-	1.9E+02	-	-	1.9E+04	-	-	-	-	-	-	-	-	1.9E+04		
3,3-Dichlorobenzidine ^c	0	-	-	2.8E-01	-	-	2.8E+01	-	-	-	-	-	-	-	-	-		
Dichlorobromomethane ^c	0	-	-	1.7E+02	-	-	1.7E+04	-	-	-	-	-	-	-	-	1.7E+04		
1,2-Dichlorethane ^c	0	-	-	3.7E+02	-	-	3.7E+04	-	-	-	-	-	-	-	-	3.7E+04		
1,1-Dichlorethylene	0	-	-	7.1E+03	-	-	7.1E+05	-	-	-	-	-	-	-	-	7.1E+05		
1,2-trans-dichloroethylene	0	-	-	1.0E+04	-	-	1.0E+06	-	-	-	-	-	-	-	-	1.0E+06		
2,4-Dichlorophenol	0	-	-	2.9E+02	-	-	2.9E+04	-	-	-	-	-	-	-	-	2.9E+04		
1,2-Dichloropropane ^c	0	-	-	1.5E+02	-	-	1.5E+04	-	-	-	-	-	-	-	-	1.5E+04		
1,3-Dichloropropene ^c	0	-	-	2.1E+02	-	-	2.1E+04	-	-	-	-	-	-	-	-	2.1E+04		
Dieldrin ^c	0	7.1E-01	1.9E-03	5.4E-04	7.1E+01	1.9E-01	5.4E-02	-	-	-	-	-	-	7.1E+01	1.9E-01	5.4E-02		
Diethyl Phthalate	0	-	-	4.4E+04	-	-	4.4E+06	-	-	-	-	-	-	-	-	4.4E+06		
2,4-Dimethylphenol	0	-	-	8.5E+02	-	-	8.5E+04	-	-	-	-	-	-	-	-	8.5E+04		
Dimethyl Phthalate	0	-	-	1.1E+06	-	-	1.1E+08	-	-	-	-	-	-	-	-	1.1E+08		
Di-n-Butyl Phthalate	0	-	-	4.5E+03	-	-	4.5E+05	-	-	-	-	-	-	-	-	4.5E+05		
2,4-Dinitrophenol	0	-	-	5.3E+03	-	-	5.3E+05	-	-	-	-	-	-	-	-	5.3E+05		
2-Methyl-4,6-Dinitrophenol	0	-	-	2.8E+02	-	-	2.8E+04	-	-	-	-	-	-	-	-	2.8E+04		
2,4-Dinitrotoluene ^c	0	-	-	3.4E+01	-	-	3.4E+03	-	-	-	-	-	-	-	-	3.4E+03		
Dioxin 2,3,7,8-tetrachlorobenzo-p-dioxin	0	-	-	5.1E-08	-	-	5.1E-06	-	-	-	-	-	-	-	-	5.1E-06		
1,2-Diphenylhydrazine ^c	0	-	-	2.0E+00	-	-	2.0E+02	-	-	-	-	-	-	-	-	2.0E+02		
Alpha-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	3.4E+00	8.7E-01	8.9E+03	-	-	-	-	-	-	-	-	3.4E+00	8.7E-01	8.9E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Waste Load Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations			
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	
Beta-Endosulfan	0	3.4E-02	8.7E-03	8.9E+01	3.4E+00	8.7E-01	8.9E+03	-	-	-	-	-	-	3.4E+00	8.7E+01	8.9E+03	
Alpha + Beta Endosulfan	0	3.4E-02	8.7E-03	-	3.4E+00	8.7E-01	-	-	-	-	-	-	-	3.4E+00	8.7E+01	-	
Endosulfan Sulfate	0	-	-	8.9E+01	-	-	8.9E+03	-	-	-	-	-	-	-	-	-	8.9E+03
Endrin	0	3.7E-02	2.3E-03	6.0E-02	3.7E+00	2.3E-01	6.0E+00	-	-	-	-	-	-	3.7E+00	2.3E+01	6.0E+00	
Endrin Aldehyde	0	-	-	3.0E-01	-	-	3.0E+01	-	-	-	-	-	-	-	-	-	3.0E+01
Ethylbenzene	0	-	-	2.1E+03	-	-	2.1E+05	-	-	-	-	-	-	-	-	-	2.1E+05
Fluoranthene	0	-	-	1.4E+02	-	-	1.4E+04	-	-	-	-	-	-	-	-	-	1.4E+04
Fluorene	0	-	-	5.3E+03	-	-	5.3E+05	-	-	-	-	-	-	-	-	-	5.3E+05
Guthion	0	-	1.0E-02	-	-	1.0E+00	-	-	-	-	-	-	-	-	1.0E+00	-	-
Heptachlor	C	0	5.3E-02	3.6E-03	7.9E-04	5.3E+00	3.6E-01	7.9E-02	-	-	-	-	-	5.3E+00	3.6E+01	7.9E+02	
Heptachlor Epoxide	C	0	5.3E-02	3.6E-03	3.9E-04	5.3E+00	3.6E-01	3.9E-02	-	-	-	-	-	5.3E+00	3.6E+01	3.9E+02	
Hexachlorobenzene	C	0	-	-	2.9E-03	-	-	2.9E-01	-	-	-	-	-	-	-	-	2.9E+01
Hexachlorobutadiene	C	0	-	-	1.8E+02	-	-	1.8E+04	-	-	-	-	-	-	-	-	1.8E+04
Hexachlorocyclohexane		0	-	-	4.9E-02	-	-	4.9E+00	-	-	-	-	-	-	-	-	4.9E+00
Alpha-BHC	C	0	-	-	1.7E-01	-	-	1.7E+01	-	-	-	-	-	-	-	-	1.7E+01
Hexachlorocyclohexane Beta-BHC	C	0	-	-	1.8E+00	-	-	-	-	-	-	-	-	-	1.6E+01	-	1.8E+02
Hexachlorocyclohexane		0	1.6E-01	-	1.8E+00	1.6E+01	-	1.8E+02	-	-	-	-	-	-	-	-	1.1E+05
Gamma-BHC (Lindane)		0	-	-	1.1E+03	-	-	1.1E+05	-	-	-	-	-	-	-	-	3.3E+03
Hexachlorocyclopentadiene		0	-	-	3.3E+01	-	-	3.3E+03	-	-	-	-	-	-	-	-	2.0E+02
Hexachloroethane	C	0	-	-	2.0E+00	-	-	2.0E+02	-	-	-	-	-	-	-	-	1.8E+01
Hydrogen Sulfide		0	-	-	1.8E-01	-	-	1.8E+01	-	-	-	-	-	-	-	-	9.6E+05
Indeno (1,2,3-cd) pyrene C		0	-	-	9.6E+03	-	-	9.6E+05	-	-	-	-	-	-	-	-	9.6E+05
Isophorone	C	0	-	-	0.0E+00	-	-	0.0E+00	-	-	-	-	-	-	-	-	0.0E+00
Kepone		0	2.4E+02	9.3E+00	-	2.4E+04	9.3E+02	-	-	-	-	-	-	2.4E+04	9.3E+02	-	-
Lead		0	-	-	1.0E+01	-	-	1.0E+01	-	-	-	-	-	-	1.0E+01	-	-
Malathion		0	-	-	1.8E+00	9.4E-01	-	1.8E+02	9.4E+01	-	-	-	-	1.8E+02	9.4E+01	-	-
Mercury		0	-	-	1.5E+03	-	-	1.5E+05	-	-	-	-	-	-	-	-	1.5E+05
Methyl Bromide		0	-	-	5.9E+03	-	-	5.9E+05	-	-	-	-	-	-	-	-	5.9E+05
Methylene Chloride	C	0	-	-	3.0E-02	-	-	3.0E+00	-	-	-	-	-	-	3.0E+00	-	-
Methoxychlor		0	-	-	0.0E+00	-	-	0.0E+00	-	-	-	-	-	-	0.0E+00	-	-
Mirex		0	7.4E+01	8.2E+00	4.6E+03	7.4E+03	8.2E+02	4.6E+05	-	-	-	-	-	7.4E+03	8.2E+02	4.6E+05	
Nickel		0	-	-	6.9E+02	-	-	6.9E+04	-	-	-	-	-	-	-	-	6.9E+04
Nitrobenzene		0	-	-	3.0E+01	-	-	3.0E+03	-	-	-	-	-	-	-	-	3.0E+03
N-Nitrosodimethylamine	C	0	-	-	6.0E+01	-	-	6.0E+03	-	-	-	-	-	-	-	-	6.0E+03
N-Nitrosodiphenylamine	C	0	-	-	5.1E+00	-	-	5.1E+02	-	-	-	-	-	-	-	-	5.1E+02
N-Nitrosod-n-propylamine	C	0	-	-	7.0E+00	1.7E+00	-	7.0E+02	1.7E+02	-	-	-	-	7.0E+02	1.7E+02	-	-
Nonylphenol		0	-	-	3.0E-02	-	-	-	-	-	-	-	-	-	-	-	-
Parathion		0	-	-	3.0E-02	6.4E-04	-	3.0E+00	6.4E-02	-	-	-	-	-	3.0E+00	6.4E-02	-
PCB Total	C	0	-	-	1.3E+01	7.9E+00	3.0E+01	1.3E+03	7.9E+02	3.0E+03	-	-	-	-	1.3E+03	7.9E+02	3.0E+03
Pentachlorophenol	C	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			WasteLoad Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations		
		Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH	Acute	Chronic	HH
Phenol	0	--	8.6E+05	--	--	8.6E+07	--	--	--	--	--	--	--	--	--	8.6E+07
Phosphorus (Elemental)	0	--	1.0E-01	--	--	1.0E+01	--	--	--	--	--	--	--	--	--	1.0E+01
Pyrene	0	--	4.0E+03	--	--	4.0E+05	--	--	--	--	--	--	--	--	--	4.0E+05
Radionuclides	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beta and Photon Activity (nrem/yr)	0	--	4.0E+00	--	--	4.0E+02	--	--	--	--	--	--	--	--	--	4.0E+02
Selenium	0	2.9E+02	7.1E+01	4.2E+03	2.9E+04	7.1E+03	4.2E+05	--	--	--	--	--	--	2.9E+04	7.1E+03	4.2E+05
Silver	0	1.9E+00	--	1.9E+02	--	--	--	--	--	--	--	--	--	1.9E+02	--	--
1,1,2,2-Tetrachloroethane ^C	0	--	4.0E+01	--	--	4.0E+03	--	--	--	--	--	--	--	--	--	4.0E+03
Tetrachloroethylene ^C	0	--	3.3E+01	--	--	3.3E+03	--	--	--	--	--	--	--	--	--	3.3E+03
Thallium	0	--	4.7E-01	--	--	4.7E+01	--	--	--	--	--	--	--	--	--	4.7E+01
Toluene	0	--	6.0E+03	--	--	6.0E+05	--	--	--	--	--	--	--	--	--	6.0E+05
Toxaphene ^C	0	2.1E-01	2.0E-04	2.8E-03	2.1E+01	2.0E-02	2.8E-01	--	--	--	--	--	--	2.1E+01	2.0E-02	2.8E-01
Trityltin	0	4.2E-01	7.4E-03	--	4.2E+01	7.4E-01	--	--	--	--	--	--	--	4.2E+01	7.4E-01	--
1,2,4-Trichlorobenzene	0	--	7.0E+01	--	--	7.0E+03	--	--	--	--	--	--	--	--	--	7.0E+03
1,1,2-Trichloroethane ^C	0	--	1.6E+02	--	--	1.6E+04	--	--	--	--	--	--	--	--	--	1.6E+04
Trichloroethylene ^C	0	--	3.0E+02	--	--	3.0E+04	--	--	--	--	--	--	--	--	--	3.0E+04
2,4,6-Trichlorophenol ^C	0	--	2.4E+01	--	--	2.4E+03	--	--	--	--	--	--	--	--	--	2.4E+03
Vinyl Chloride ^C	0	--	2.4E+01	--	--	2.4E+03	--	--	--	--	--	--	--	--	--	2.4E+03
Zinc	0	9.0E+01	8.1E+01	2.6E+04	9.0E+03	8.1E+03	2.6E+06	--	--	--	--	--	--	9.0E+03	8.1E+03	2.6E+06

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- For transition zone waters, spreadsheet prints the lesser of the freshwater and saltwater water quality criteria.
- Regular WLA = (WQC x WLA multiplier) / (background conc.)
- Antideg. Baseline = (0.125(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- Antideg. WLA = (Antideg. Baseline)(WLA multiplier) - (WLA multiplier - 1)(background conc.)

Site Specific Target Value (SSTV)		
Metal		
Antimony	6.4E+04	
Arsenic III	2.2E+03	
Cadmium	5.3E+02	
Chromium III	#VALUE!	
Chromium VI	3.0E+03	
Copper	3.6E+02	
Lead	5.6E+02	
Mercury	5.6E+01	
Nickel	4.9E+02	
Selenium	4.3E+03	
Silver	7.6E+01	
Zinc	3.6E+03	

All data is in ug/L unless otherwise noted.

NDR: No data reported.

All data as reported with permit application unless otherwise noted.

Pollutants reported as at a QL equal to or less than the DEQ specified QL are considered absent for the purpose of this evaluation.

PARAMETER	Effluent Data	ACUTE WLA	CHRONIC WLA	HUMAN HEALTH STANDARD	COMMENTS	
Aceanaphthene	NDR	-	-	99,000	Not evaluated.	
Acrolein	<10.0	-	-	930	Reported value below WLA. No limit required.	
Acrylonitrile	<10.0	-	-	250	Reported value below WLA. No limit required.	
Aldrin	NDR	-	-	0.05	Not evaluated.	
Ammonia-N (mg/l) - Annual	DMR: 1.2, 8.8, 89.1, 61.5, 8.97, 4.43, 3.7, 5.5, 14.9, 19.2, 7.4, 9.0, 1.6, 0.9, 2.6, 1.75, 8.95, 16.1, 0.78, 0.74, 11.1, 0.97, 0.82, 1.9, 4.4, 14.1, 21.0, 34, 7.5, 11.6, 29.2, 23.8, 16.8, 22.3, 34.0	132	19.9	-	Statistical evaluation of DMR data indicates the need for a limitation of 32.6 mg/L (40.2 mg/L max).	
Ammonia-N (mg/l) - Winter	Not Applicable	-	-	-	Does not apply because no tiered limits in permit.	
Anthracene	NDR	-	-	4,000,000	Not evaluated.	
Antimony	NDR	-	-	64,000	Not evaluated.	
Arsenic	NDR	6,900	3,600	-	Not evaluated.	
Benzene	NDR	-	-	51,000	Not evaluated.	
Benzidine	<50.0	-	-	0.2	Reported QL greater than HH. Retesting recommended.	
Benzo (a) anthracene	NDR	-	-	18	Not evaluated.	
Benzo (b) fluoranthene	NDR	-	-	18	Not evaluated.	
Benzo (k) fluoranthene	NDR	-	-	18	Not evaluated.	
Benzo (a) pyrene	NDR	-	-	18	Not evaluated.	
Bis(2-Chloroethyl) Ether	<10.0	-	-	530	Reported value below WLA. No limit required.	
Bis(2-Chloroisopropyl) Ether	<10.0	-	-	6,500,000	Reported value below WLA. No limit required.	
Bis(2-Ethylhexyl) Phthalate	NDR	-	-	2,200	Not evaluated.	
Bromoform	NDR	-	-	140,000	Not evaluated.	
Butyl benzyl phthalate	NDR	-	-	190,000	Not evaluated.	
Cadmium	NDR	4,000	880	-	Not evaluated.	
Carbon Tetrachloride	NDR	-	-	1,600	Not evaluated.	
Chlorodane	NDR	9	0.4	0.81	Not evaluated.	
TRC	Not Required	-	-	-	Discharge to salt water.	
Chlorine Prod. Oxidant	NDR	1,300	750	-	Not evaluated.	
Chlorobenzene	<10.0	-	-	160,000	Reported value below WLA. No limit required.	
Chlorodibromomethane	NDR	-	-	13,000	Not evaluated.	
Chloroform	NDR	-	-	1,100,000	Not evaluated.	
2-Chloronaphthalene	<10.0	-	-	160,000	Reported value below WLA. No limit required.	
2-Chlorophenol	NDR	1.1	0.56	-	15,000	Not evaluated.
Chlorpyrifos	NDR	-	-	-	Not evaluated.	
Chromium III	NDR	-	-	-	Not evaluated.	
Chromium VI	NDR	110,000	5,000	-	Not evaluated.	
Chrysene	NDR	-	-	1.8	Not evaluated.	
Copper	NDR	930	600	-	Not evaluated.	
Cyanide, Free	NDR	100	100	1,600,000	Not evaluated.	
DDD	NDR	-	-	0.31	Not evaluated.	
DDE	NDR	-	-	0.22	Not evaluated.	
DDT	NDR	13	0.1	0.22	Not evaluated.	

Demeton	NDR	-	10	-	Not evaluated.
Diazinon	NDR	82	82	-	Not evaluated.
Dibenzo(a,h)anthracene	NDR	-	-	18	Not evaluated.
1,2-Dichlorobenzene	NDR	-	-	130,000	Not evaluated.
1,3-Dichlorobenzene	NDR	-	-	96,000	Not evaluated.
1,4-Dichlorobenzene	NDR	<10.0	-	-	19,000 Not evaluated.
3,3'-Dichlorobenzidine	NDR	-	-	28	Reported value below WLA. No limit required.
Dichlorobromomethane	NDR	-	-	17,000	Not evaluated.
1,2-Dichloroethane	NDR	-	-	37,000	Not evaluated.
1,1-Dichloroethylene	NDR	-	-	710,000	Reported value below WLA. No limit required.
1,2-trans-dichloroethylene	NDR	<10.0	-	-	29,000 Not evaluated.
2,4-Dichlorophenol	NDR	-	-	-	15,000 Reported value below WLA. No limit required.
1,2-Dichloropropane	NDR	<10.0	-	-	21,000 Reported value below WLA. No limit required.
1,3-Dichloropropene	NDR	<10.0	-	-	710,000 Not evaluated.
Dieldrin	NDR	-	-	-	4,400,000 Not evaluated.
Diethyl Phthalate	NDR	-	-	85,000	Not evaluated.
2,4-Dimethylphenol	NDR	-	-	110,000,000	Reported value below WLA. No limit required.
Dimethyl Phthalate	NDR	<10.0	-	-	450,000 Reported value below WLA. No limit required.
Di-n-Butyl Phthalate	NDR	<10.0	-	-	530,000 Reported value below WLA. No limit required.
2,4-Dinitrophenol	NDR	<50.0	-	-	28,000 Reported value below WLA. No limit required.
2-Methyl-4,6-Dinitrophenol	NDR	<50.0	-	-	3,400 Not evaluated.
2,4-Dinitrotoluene	NDR	-	-	0.000051	Not evaluated.
Dioxin 2,3,7,8-tetrachlorobenzop-dioxin	NDR	-	-	200	Reported value below WLA. No limit required.
1,2-Diphenylhydrazine	NDR	<10.0	-	8,900	Reported value is below detection level. Believed absent.
Alpha-Endosulfan	NDR	<0.104	3.4	0.87	8,900 Reported value is below detection level. Believed absent.
Beta-Endosulfan	NDR	<0.042	3.4	0.87	8,900 Reported value is below detection level. Believed absent.
Alpha + Beta Endosulfan	NDR	-	3.4	0.87	- Not evaluated.
Endosulfan Sulfate	NDR	<0.010	-	-	8,900 Reported value below WLA. No limit required.
Endrin	NDR	3.7	0.23	6	Not evaluated.
Endrin Aldehyde	NDR	<0.208	-	30	Reported value below WLA. No limit required.
Ethylbenzene	NDR	-	-	210,000	Not evaluated.
Fluoranthene	NDR	-	-	14,000	Not evaluated.
Fluorene	NDR	-	-	530,000	Not evaluated.
Guthion	NDR	-	1	-	Not evaluated.
Heptachlor	NDR	5.3	0.36	0.079	Reported value is below detection level. Believed absent.
Heptachlor Epoxide	NDR	<0.208	5.3	0.36	0.039 Reported value is below detection level. Believed absent.
Hexachlorobenzene	NDR	<10.0	-	-	0.29 Reported QL greater than HH. Retesting recommended.
Hexachlorobutadiene	NDR	<10.0	-	-	18,000 Reported value below standard. No limit required.
Hexachlorocyclohexane	NDR	<0.021	-	-	4.9 Reported value below standard. No limit required.
Alpha-BHC	NDR	-	-	-	17 Reported value below standard. No limit required.
Hexachlorocyclohexane Beta-BHC	NDR	<0.052	-	-	180 Not evaluated.
Gamma-BHC (Lindane)	NDR	16	-	-	110,000 Reported value below WLA. No limit required.
Heptachlorocyclopentadiene	NDR	<10.0	-	-	3,300 Reported value below WLA. No limit required.
Hexachloroethane	NDR	<10.0	-	-	

Hydrogen Sulfide	NDR	-	-	200	-	-	Not evaluated.
Indeno (1,2,3-cd) pyrene	NDR	-	-	-	18	Not evaluated.	
Isophorone	NDR	-	-	-	960,000	Not evaluated.	
Kepone	NDR	-	-	0	-	-	Not evaluated.
Lead	NDR	24,000	930	-	-	-	Not evaluated.
Malathion	NDR	-	-	10	-	-	Not evaluated.
Mercury	NDR	180	94	-	150,000	Reported value below WLA. No limit required.	
Methyl Bromide	<10.0	-	-	-	590,000	Not evaluated.	
Methylene Chloride	NDR	-	-	-	-	-	Not evaluated.
Methoxychlor	NDR	-	-	-	-	-	Not evaluated.
Mirex	NDR	-	-	-	-	-	Not evaluated.
Nickel	NDR	7,400	820	-	460,000	Not evaluated.	
Nitrobenzene	NDR	-	-	-	69,000	Not evaluated.	
N-Nitrosodimethylamine	<10.0	-	-	-	3,000	Reported value below WLA. No limit required.	
N-Nitrosodiphenylamine	<10.0	-	-	-	6,000	Reported value below WLA. No limit required.	
N-Nitrosodi-n-propylamine	<10.0	-	-	-	510	Reported value below WLA. No limit required.	
Nonylphenol	NDR	700	170	-	-	-	Not evaluated.
Parathion	NDR	-	-	-	-	-	Not evaluated.
PCB Total	***	-	-	3	0.064	Permittee provided PCB data for individual congeners as follows: Aroclor1016: <1 Aroclor1221: <1 Aroclor1232: <1 Aroclor1242: <1	Restesting of total PCB recommended..
Pentachlorophenol	NDR	1,300	790	790	3,000	3,000	Not evaluated.
Phenol	NDR	-	-	-	86,000,000	86,000,000	Not evaluated.
Phosphorus (Elemental)	NDR	-	-	10	-	-	Not evaluated.
Pyrene	NDR	-	-	-	-	-	Not evaluated.
Radionuclides	NDR	-	-	-	-	-	Not evaluated.
Beta and Photon Activity (mercury)	NDR	-	-	-	400	400	Not evaluated.
Selenium	NDR	29,000	7,100	420,000	420,000	420,000	Not evaluated.
Silver	NDR	190	-	-	-	-	Not evaluated.
1,1,2,2-Tetrachloroethane	<10.0	-	-	-	4,000	4,000	Reported value below WLA. No limit required.
Tetrachloroethylene	NDR	-	-	-	3,300	3,300	Not evaluated.
Thallium	NDR	-	-	-	47	47	Reported value below WLA. No limit required.
Toluene	NDR	-	-	-	600,000	600,000	Not evaluated.
Toxaphene	NDR	21	0.02	0.02	0.28	0.28	Not evaluated.
Tributyltin	NDR	42	0.74	0.74	-	-	Not evaluated.
1,2,4-Trichlorobenzene	NDR	-	-	-	7,000	7,000	Not evaluated.
1,1,2-Trichloroethane	<10.0	-	-	-	16,000	16,000	Reported value below WLA. No limit required.
Trichloroethylene	NDR	-	-	-	30,000	30,000	Not evaluated.
2,4,6-Trichlorophenol	NDR	-	-	-	2,400	2,400	Not evaluated.
Vinyl Chloride	NDR	-	-	-	2,400	2,400	Not evaluated.
Zinc	NDR	9,000	8,100	8,100	2,600,000	2,600,000	Not evaluated.

OUTFALL 002 STAT.EXE LIMITATION EVALUATION

Chemical = Ammonia
Chronic averaging period = 30
WLAA = 132
WLAC = 19.9
WLAC = 19.9
Q.L. = 0.1
samples/mo. = 2
samples/wk. = 1

Summary of Statistics:

observations = 1
Expected Value = 250
Variance = 22500
C.V. = 0.6
97th percentile daily values = 608.354
97th percentile 4 day average = 415.947
97th percentile 30 day average= 301.513
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity
Maximum Daily Limit = 40.1516348589846
Average Weekly limit = 40.1516348589846
Average Monthly Limit = 32.6506665763086

The data are:

GM00-2011 instructs staff that if an industrial facility has an ammonia limitation that data collected to demonstrate compliance with that limitation cannot be used to determine if a reasonable potential to cause or contribute to a violation of the water quality standard exists. In order to evaluate the reasonable potential for ammonia from industrial facility with an ammonia permit limitation, a high, fictitious data point (rather than actual data) should be entered into the statistical analysis software. The resulting limitation is then compared to the existing limitation to determine if it is sufficient to protect water quality.

Previously the ammonia limitation at Outfall 002 was a 38.0 mg/L (average) and 45.0 mg/L (maximum). As demonstrated by the statistical analysis on the left, these limitations are not protective of water quality; therefore, more stringent limitations for ammonia are needed. Ammonia limitations at Outfall 002 will be revised to 32.6 mg/L (average) and 40.2 mg/L (maximum). Because monthly reporting data submitted by the permittee indicates that they are able to consistently achieve these concentrations, no compliance schedule for ammonia will be implemented.